The Chemical Age

A Weekly Journal Devoted to Industrial & Engineering Chemistry

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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German Chemical Industry

STUDENTS of industrial and economic conditions in Germany will find much to interest them in the general report, just issued by the Department of Overseas Trade, on the industrial and economic situation in Germany in December, 1920 (Cmd. 1114, 9d.). The conditions may have changed a little since the report was written, but the picture corresponds more nearly with the actual contemporary conditions than any yet presented. The authors, Mr. J. W. F. Thelwall, commercial secretary to the British Embassy at Berlin, and Mr. C. J. Kavanagh, British commercial secretary for the occupied territories, are to be complimented on the thoroughness with which they have explored the ground, and on the dispatch with which their work has been completed.

The first impression is one of surprise at the ease with which the German people have recognised the completeness of their collapse, and at the thoroughness with which they are applying themselves to the reconstruction of their industrial life. On looking back over the past two years it is impossible, the authors remark at the outset, not to be struck by the evidences of improvement in all departments of public and private life in Germany. The one important and conspicuous exception is German State finance. This is described as in that desperate condition which must follow on four years of gambling succeeded by two years during which revenue could not meet expenditure. The root of the evil is the incessant flow of paper money. As to the general position of traders and manufacturers, even the authors—from an entirely detached and not unduly appreciative point of view—cannot but admire the skill with which they have not only survived the fluctuations and disturbances, but have done good business in spite of them. No satisfactory explanation has been forthcoming that the high dividends earned have been due to anything but successful trading, though among the factors which helped towards the satisfactory balance sheets of 1919 were the large sums paid by the State on the conclusion of the armistice to all branches of industry for the termination of current war contracts. The success may really seem more substantial than it is, for the German manufacturer or merchant, when confronted with the brilliant figures, has been heard to offer the cynical remark, "After all, it is only paper." Moreover, while the company reports at the end of 1919 almost invariably recorded plenty of orders on hand, the chairmen at the shareholders' meetings in 1920 remained notably silent about current business or future prospects.

The two chief impressions left on the authors' minds in surveying Germany's general commercial policy are the growth of combines within the country and co-operation with foreign groups. The syndicates are distinguished by the terms "horizontal" and "vertical," the latter being a combination of the various stages of manufacture from the first work upon the raw material to the final finished product, and the former a combination of several factories all carrying out the same kind of manufacture. The inclination to create syndicates, already marked before the war, is reported to have become much stronger during the last two years, and to have spread to every branch of industry and trade. Concurrently there has been a movement to get into closer touch with foreign consumer by giving a foreign firm a direct interest, though not a controlling one, in German concerns, or in forming a company abroad in which several German companies participate. These foreign alliances are intended not only to facilitate the import of materials with the aid of foreign currency, but also to find a field in which the resulting manufactures can be sold, because export is now more than ever an imperative need of German trade and industry.

The section of the report which deals with German chemical industry is reproduced substantially on another page. As we pointed out some time ago, German industry is based, like our own, largely on coal, and though not quite free from trouble we are happily free from the shortage experienced in Germany. In May

only 88 per cent. of the coal requirements of German chemical industry was covered, and an additional reduction of 25 per cent. had to be made in August. The glass and porcelain industry, which was not receiving half of its coal requirements in the spring, had its allotment reduced by a further 50 per cent.; in the case of the potash industry the reduction was 40 per cent., and in copper smelting works it amounted to 46 per cent. A considerable portion of the chapter is devoted to the German potash industry. The question has arisen, the report states, whether the German potash syndicate should charge higher rates to German agriculture, or should continue to deliver to the latter under cost price, making its profits on its foreign sales. The latter course appears to have been adhered to—in short, the old " dumping " policy. Fortunately British consumers are no longer entirely dependent on German sources. French potash, we believe, is coming into use in this country in increasing quantities, and if only as an alternative source of supply it is important that the French industry should be encouraged. For if Germany could succeed in killing it and in re-establishing her former monopoly we might expect a rapid and drastic revision of German prices, to our own disadvantage.

Little Hope for Petrol Users

We have frequently drawn attention to the delay which occurs in the publication of Government reports. The latest, dealing with the petrol position, is no exception to the usual practice, for although dated November 23 of last year, it has only just become available for general use. In many branches of trade and industry events nowadays move so rapidly that a long interval between presentation and publication of a report may vitiate the value of the criticisms and recommendations it contains. Many reports, again, such as that issued annually by the Chief Inspector under the Alkali Act, are notably full of extremely helpful and uncommon information, but as these reports usually appear about six months after the end of the period with which they deal, many readers are precluded for an unnecessarily long time from taking advantage of suggestions which may prove of considerable benefit in their everyday operations.

So far as the petrol report is concerned, it was scarcely to be anticipated that it could provide any hope of alleviating the position of the consumer, for the oilfields responsible for the largest output are all controlled by powerful private interests. The real position is that supplies are still being outstripped by demands, and while this continues it is unlikely that those in a position to dictate terms will curtail their profits until the state of the market makes this necessary. In almost all other commodities the market has turned lately, and there are indications in America that the producers of oil have fairly heavy stocks on hand. In this country there has been a decided break in lubricating oils, while lower prices appear to be imminent in the heavier products such as fuel oil. For our own part, we believe that petrol prices have reached their zenith, but that they may be affected in part as time goes on by the new taxation rates for motor cars in this country, which are driving motorists to lower-powered cars and, therefore, to a generally reduced petrol consumption. The unfortunate fact about the whole business, however, is that petrol control is practically concentrated in the hands of two world combines—the Standard Oil Co. and the Royal Dutch Shell group—and any drastic action might result in the withdrawal of supplies which could readily be placed elsewhere. This fact is fully appreciated by the Standing Committee which has had the matter in hand, and it is recognised that the Government could not on its own initiative fix prices on the basis of the cost of production without incurring the danger of diverting supplies. The way, however, is open for some control of freight and for fixing fair distribution and auxiliary charges in this country.

The general conclusion arrived at is that, of two means for overcoming the prevailing difficulties, one would be for the consuming countries of the world to take combined action through the economic section of the League of Nations. The other method is the production of substitutes in such quantities as to constitute formidable competition. On paper or in committee, of course, the question of substitutes is a simple one, but that its simplicity in practice is not so apparent is evident from the fact that the quantities found on the market seem to be in inverse proportion to the amount of rhetoric expended on them. It is, for instance, easy for one Government department to recommend the compulsory recovery of benzol resulting from the carbonisation of coal, while another department—the Board of Trade—is concerned with new gas legislation which is directly antagonistic to the recovery of benzol. Incidentally, it would seem that benzol as an appreciable factor can never assert itself so long as, with the " therm " standard of purveying gas in vogue, it remains from the producers' standpoint the most valuable constituent of the mixture.

Storage of Permissible Explosives

The latest report of the U.S. Department of the Interior in connection with the production of explosives in the United States contains some interesting information relative to permissible explosives. In order that the user may be assisted in his selection of the correct substance the civil explosives are classified in two ways, namely (*a*) on the basis of the volume of poisonous gases produced by a unit weight; and (*b*) on the basis of the characteristic ingredient of each explosive. Most permissible explosives when properly detonated in a drill hole in a coal mine produce poisonous gases, but they produce at the same time a much larger volume of non-poisonous gases. In order that the poisonous gases may not under normal conditions become a menace to the lives or health of miners no explosive is now considered permissible if it evolves upon detonation more than $5\frac{1}{2}$ cubic feet of permanent poisonous gases. Carbon monoxide appears to be the only toxic product evolved, and it is found this may be present in the atmosphere so long as four minutes after the shot has been fired. It is evident, therefore, that in situations where ventilation is not active, as in a closed heading, the operators should not return to the face until at least five minutes after detonation.

As regards the characteristic explosives it is pointed out that ammonium nitrate when fresh and properly

detonated, is well adapted for use in mines that are not unusually wet. It is not suitable for use in wet mines, for if the contents of a cartridge of ammonium nitrate explosive are exposed for only a few hours to the damp atmosphere the explosive may so deteriorate as to fail to detonate completely, because ammonium nitrate takes up moisture readily. The re-dipping of cartridges of ammonium nitrate explosives aids in protecting the contents against moisture, or moist air, and the cartridges should be so stored and handled as to preserve the efficacy of the paraffin-like coating. The explosives should be obtained in a fresh condition and purchased in such quantities as will permit their prompt use. Experience at the Pittsburgh experimental station of the Bureau of Mines shows that ammonium nitrate explosives will usually detonate completely after storage for six months in a well-ventilated magazine. Storage is an important matter, and all explosives should be kept in well-ventilated magazines, at temperatures not exceeding 90°F. The boxes should be placed so that the cartridges lie horizontally, though the tops of the boxes may be up or down. The explosives purchased first should be used first, and hence older explosives should not be stored under or behind a fresh consignment. It is well to purchase explosives in such quantities that they can be used promptly.

"Round a Bottle"

THE popular impression that chemists are deficient in human and social qualities is quite dispelled by Dr. Stephen Miall in his London Letter to the current number of the *Journal of Industrial and Engineering Chemistry*. Writing of the forthcoming visit of the Society of Chemical Industry to Canada, and the discussions which are taking place on the question of chemical publications, he draws with little more than a stroke a picture engaging enough to produce a rush to book passages. The details may be filled in according to the knowledge or the imagination of the reader, but these are Dr. Miall's exact words :—

> Your experience in America, I am sure, will be a valuable guide to the British Committee, and if their deliberations are not concluded before the summer we may learn a great deal from you in a quiet talk round a bottle of any sustaining fluid which the ingenuity of man may devise and procure for the purpose. Water's the best of drinks, they say, and all the poets sing, but who am I, that I should have the best of anything!

This picture recalls a current story of some very prominent notabilities in the chemical world who recently relaxed after a hard day's conference in the snuggery of a working-class public house. The beverage was an honest English brew, served in pewter, as connoisseurs say it should be. When one of the company who might easily be mistaken for some eminent diocesan, called for another, the serving maid with embarrassing intimacy, remarked, "I know who you are." Taken aback, and not quite knowing what disclosures might follow, he could think of nothing more original to say than "Oh, do you?" "Yes," came the prompt retort, "between the orders I was reading the paper, and saw your picture in it. Here it is—you are ——!" But we must not betray these intimate confidences—"round a bottle."

Free Export of Dyestuffs

FROM Tuesday last, as announced in THE CHEMICAL AGE of last week, all Government restrictions on the export of dyes, dyestuffs, and intermediates have been removed. For some time previously the Board of Trade had been gradually relaxing the restrictions, and apparently these experiments had produced none of the adverse effects on the home market which had been feared. A condition of freedom for export will be heartily welcomed on all sides, and probably not least of all by the permanent officials whose thankless task it is to apply restrictions to cases greatly varying in detail and to preserve a right balance between conflicting interests. Naturally, Government departments err, if at all, on the side of caution, for if an experiment turns out badly they are liable to be charged with bad judgment and exposed to criticism. The fact that the all but complete lifting of restrictions, announced in our columns on January 22, has been followed within a few days by a decision to remove them altogether is sufficient proof that the stuff previously held up for the lack of a manufacturers' certificate was not essential for the maintenance of home supplies. The sooner it is turned into money in export markets the better it will be for British trade from every point of view. The merchant class will particularly appreciate the concession, which, incidentally, illustrates the importance of organisation in support of collective action.

The Calendar

Feb. 7	The Finsbury Technical College, Chemical Society: "Plantation Para Rubber," by B. J. Eaton. 3 p.m.	Technical College, Leonard Street, London.
7	British Association of Chemists (Liverpool Section): "Patent Law and Chemical Research," by H. E. Potts. 7.30 p.m.	Chemical Department, The University, Brownlow Street, Liverpool.
7	Chemical Association: "The Rise of Organic Chemistry," by J. J. Breslin. 4.30 p.m.	Royal College of Science, Dublin.
7	Royal Institution of Great Britain: General Meeting. 5 p.m.	Albemarle Street, Piccadilly, London.
7	Society of Chemical Industry (London Section): "The Erosion of Bronze Propellers," by Dr. O. Silberrad. 8 p.m.	Burlington House, Piccadilly, London.
8	Institute of Metals: (Scottish Section): "Aluminium, its Production and Uses," by G. H. Bailey. 8 p.m.	Institution of Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow
9	Society of Chemical Industry (Newcastle-on-Tyne Section): "Lubrication and Lubricants," by L. Archbutt. 7.30.	Armstrong College, Newcastle-on-Tyne

Books Received

A DICTIONARY OF APPLIED CHEMISTRY. By Sir Edward Thorpe. Vol. I. London: Longmans, Green & Co. Pp. 752. 60s. net.

WELLCOME CHEMICAL RESEARCH LABORATORIES PUBLICATIONS Nos. 176 to 185. London: 6, King Street, Snow Hill, E.C. 1.

A METALLOGRAPHIC STUDY ON TUNGSTEN STEELS. By Axel Hultgren. New York: John Wiley & Sons, Inc., London. Chapman & Hall, Ltd., pp. 95. 16s. 6d. net.

Ammonia Oxidation Units for Sulphuric Acid Plants

By Wilfrid Wyld, F.C.S.

In our editorial comments recently we raised the question of employing the ammonia converter in conjunction with sulphuric acid plants, and in lieu of nitrate of soda. We pointed out that progress with ammonia oxidation for this purpose seemed to have come to a halt. Mr. Wyld now takes the matter further and discusses the precautions to be observed when the newer method of providing the necessary oxides of nitrogen is employed.

REFERRING to your leader on the above subject in a recent issue of the CHEMICAL AGE, it might be of interest to your readers—more especially to those who are still using nitrate of soda in the manufacture of sulphuric acid—if some further information upon the subject were available. When it is stated that ammonia in the purest form is not at all essential in the oxidation process, your readers may probably give further thought to the subject.

There is little doubt that during the war, oxidation units were designed and erected by firms having little experience of such types of apparatus (which require great care in their design and erection), the consequence being that troubles arose and were not easily overcome. Some of these were probably due to the difficulty in obtaining the requisite parts, and also to the inexperience of the chemists and workmen who were placed in charge of the process.

A suitable quality of ammonia can be produced at any works having ordinary stills for the manufacture of sulphate of ammonia.

It is only necessary to divert a portion of the gases leaving the liming portion of the plant into a water-cooled series of small condensers, the weaker condensates being returned, by gravity, to the distillation column—otherwise the strongest liquor ammonia producible would not exceed 10 per cent., and the cost of carriage would therefore have to be borne in mind in the case of delivery to works at a distance.

The efficiency of the oxidation units can easily be maintained at an average of 90 per cent., and it is a simple matter to calculate the relative costs of nitrate of soda and ammonia oxidation.

For the benefit of those who have not had experience in the handling and storage of ammonia liquor in bulk, it will be as well for the following points to be considered :—

(*a*) The ammonia should be preferably delivered to the acid works in railway tanks, these vessels being arranged with facilities for discharging their contents by compressed air.

(*b*) The storage reservoir should be an overhead lead-lined air-tight vessel, or constructed from a boiler shell.

(*c*) Iron or lead connections may be used for conveying the air, or ammonia, to or from the siding, and

(*d*) The vent of the storage reservoir should be connected to a small water-fed washer. Failure to take this simple precaution means probably a loss of ammonia exceeding £100 per annum in a medium sized works.

This small wash-column or scrubber should be so constructed that when pressure is applied there is a washing effect, but when vacuum occurs—as happens when the contents of the store are running off—the water contained in the scrubber is not drawn into the store. This simple arrangement is preferable to spring vacuum valves, and is fool-proof.

When the attendant finds escape of ammonia from the exit of this scrubber, it is only necessary to run in a supply of water, and this is rarely required more frequently than when a railway tank is being discharged.

Should the storage vessel be exposed to the heat of the sun, or other source, with such an arrangement as above described, all ammonia, that would otherwise escape, is recovered.

From the overhead storage, a main should be carried to a lower but smaller one, which commands the feed pump, and this vessel and all other containers should be also connected to the scrubber.

Another system of preventing loss of ammonia in storage vessels is to retain a 1 in. layer of shale oil on the surface of the ammonia, the gravity of the oil being below 0.900. The objection to this is that inadvertently this oil might be drawn off, and subsequent trouble arise in the working of the ammonia oxidation plant.

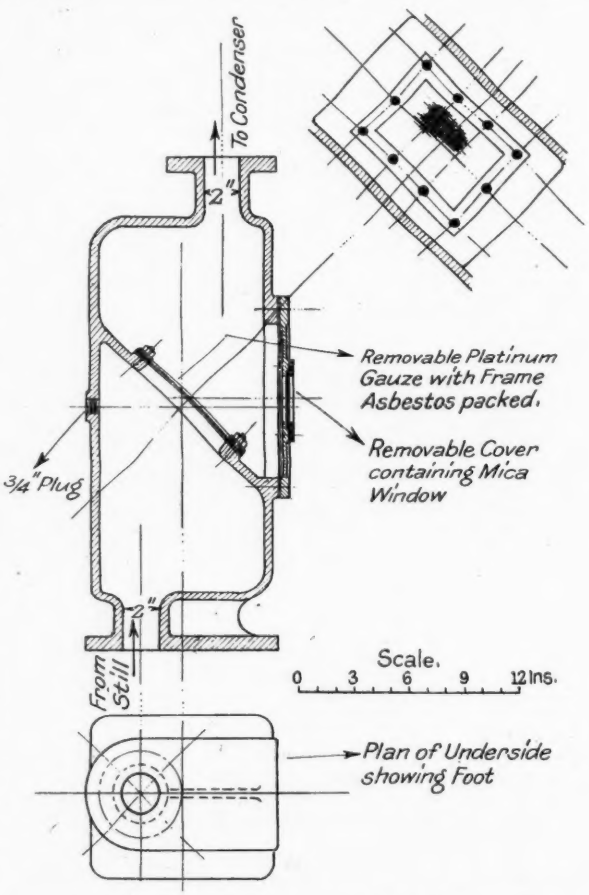
The steam supply of the still needs nothing out of the ordinary; a constant supply, and preferably of low pressure, is all that is necessary.

In the design of a converter, one would like to see some improvement over those designed by the Ministry of Munitions, for they were very heavy to handle, and a gauze was often soiled when re-assembling. The writer, therefore, designed the converter box as illustrated below.

The gauzes are thus accessible without removing the converter body, as was necessary in those units first designed.

When fixing the catalyst, special precautions should be taken in placing the asbestos washers in position. This substance easily disintegrates, and pieces may fall on the gauzes and thus impair their efficiency.

For preliminary heating a catalyst, the simplest and safest method is to burn a jet of pure hydrogen by inserting the



blow-pipe through the hole provided for the purpose. A minute or so is usually sufficient if the supply of ammonia, well diluted with air, is turned on previous to inserting the flame.

In the arrangement of the distillation column, it is advisable to construct this on well-known principles, but many columns are simply packed with gas coke, and such answer fairly well, but precautions must be taken to prevent any particles of coke dust being carried with the gaseous ammonia travelling to the converter.

It is advisable to use lead piping from the still head to the converter, for, if of iron, rust occurs, and in many cases the catalyst has been rendered inactive thereby.

The air supply to the still requires careful filtering, for the atmosphere of a chemical works is not, as a rule, very pure, and the packing in the still does not filter out the last trace.

Given a fairly pure ammonia and air, and a clean catalyst, a converter should run several months without its being necessary to remove the gauzes for cleaning.

The platinum gauzes recommended by the Ministry of Munitions consisted usually of four layers of ·065"-diameter platinum wire, 80 to the linear inch, but I am of the opinion that wire of ·0125 and 120 to 150-mesh per inch would be preferable.

In order to reduce the amount of platinum required, the number of layers could then be reduced to two without impairing the efficiency of the unit.

The ammonia mixture for normal working is 1 volume of NH_3 to 7·5 volumes of air, when the following reaction occurs :—

(*a*) $2NH_3+3O_2=2NO+3H_2O$.

With too rich a mixture the following takes place :—

(*b*) $2NH_3+\frac{3}{2}O_2=N_2+3H_2O$,

the combustion of the hydrogen thus occurring, and a high-pitched sound usually emanates from the converter, which can be heard a considerable distance, not without alarm to those inexperienced on such plants.

The reaction (*a*) being reversible, it is necessary to control the temperature to within certain limits :—

(*c*) $2NO=N_2+O_2$.

In order to obtain the most satisfactory results, it is advisable to maintain the gauzes at a dull-red heat, higher temperatures to bright red result in the fusing of the platinum.

Escape of unconverted ammonia through the gauzes reduces the efficiency :—

(*d*) $NH_3+HNO_2=N_2+N_2O$,

thus twice the amount of nitrogen originally present with the ammonia is lost.

The use of the finer meshed gauze recommended above tends to minimise such occurrence.

The output per converter can be adjusted within a range of 20 per cent. over or above its normal running without danger, and this should be ample for ordinary acid plants.

The production may be taken at 1·5 tons of nitric acid per square foot of catalyst per 24 hours.

When dark spots appear on the heated gauzes, seen through the mica window, this may be due to the gauzes not being thoroughly cleaned, or to particles of dust.

If these cannot be burned off by increasing the strength of the ammonia vapour, the gauzes should be removed and cleaned, otherwise the efficiency may be reduced to 80 per cent. and under.

In considering the proposition of substituting the nitre potting by an ammonia oxidation unit, the importance of the saving of nitre pots, cost of maintenance of flues and ovens, &c., should be taken into account, and, if so, I have little doubt that there would be slight hesitation in coming to a decision in favour of the more cleanly method of applying the oxides of nitrogen to the chamber process.

The control of the catalyst process is very simple, and the oxides of nitrogen are more easily applied directly to the exit of the Glover tower, than the usual practice of nitre potting in the flues leading to the Glover tower.

So much has been written upon the subject of chemical control of these plants that I need hardly here enter into this subject.

I would, in conclusion, advise independent units being installed for each set of chambers, and that whole apparatus be placed in a building to itself.

Photographic Combine

An amalgamation has been arranged which involves the formation of a new company with an authorised capital of over £1,000,000. The companies concerned are :—The Paget Prize Plate Co., Ltd., Watford ; Rajar, Ltd., Mobberley, Cheshire ; Marion & Co., Ltd., Soho Square and Southgate ; Marion & Foulger, Ltd., Bedford ; A. Kershaw & Sons, Ltd., Leeds ; Kershaw Optical Co., Ltd., Leeds, and the Rotary Photographic Co. (1917), Ltd., West Drayton. Application for registration was made on Tuesday under the name of Amalgamated Photographic Manufacturers, Ltd.

A Note on Permanganate Titrations

By A. Renfred Myhill, A.I.C.

A point which is often overlooked in connection with permanganate titrations and other volumetric estimations where an oxidizing agent is used, is the reducing effect which filter paper has upon the re-agent.

Where, for instance, iron is being estimated, it is very often the practice to precipitate firstly the metal as hydroxide by means of soda or ammonia, and to dissolve the precipitated substance in dilute acid, the resulting solution being reduced and titrated with standard permanganate solution.

In the process of dissolving the precipitate, the solution is almost bound to become contaminated with filter paper or with the products of reaction of cellulose and acid.

A method frequently adopted is to make a hole in the paper, and, after first washing (by means of hot water), the bulk of the precipitate in a vessel placed underneath, to moisten the paper with acid and complete the solution in this manner. A better method is to pour the acid on to the filter containing the precipitate and to conduct the whole operation without breaking the paper. Other operators macerate the paper and its contents with acid, and, after re-filtering, reduce the solution and proceed in the usual manner.

All these methods are open to objections. The writer has noticed frequently, when carrying out the titration, that the "end point" is indefinite. A more or less definite end point is usually produced when all the ferrous iron has been oxidised, but, upon adding further permanganate, the red colour which is first produced is slowly discharged, until a second end point is reached. This behaviour is due to the presence of organic matter derived from the filter. It is not necessary for the paper to be present in actual particles in the solution.

A perfectly clear solution, if it is acid, and has previously been for any length of time in contact with a filter paper, will almost always reduce permanganate.

The simple experiment may easily be performed of macerating a filter paper with a 25 per cent. solution of sulphuric acid, allowing to boil for half an hour and filtering.

The filtered liquid, after cooling, will be capable of decolorising a comparatively large quantity of $N/10KMnO_4$.

The action is no doubt due, in part, if not wholly, to the production of invert sugar by the action of the acid on the paper, the latter, as is well known, possessing marked reducing properties.

The above remarks will lead one to view with suspicion an analysis carried out with standard permanganate, in which the reducing substance has become contaminated with filter paper, previous to the titration.

In such cases it is advisable to consider whether a gravimetric or other method of determining the desired constituent would not be a better one.

The errors introduced are usually too large and too variable to be allowed for by a blank experiment.

Death of Dr. J. C. Cain

We regret to announce the death of Dr. J. C. Cain, which occurred at Brondesbury Park, London, on Monday last. Dr. Cain, who was a well-known and highly respected member of the chemical industry, was formerly technical manager to Messrs. Brooke, Simpson & Spiller, one of the earliest established firms of aniline dye manufacturers in this country with whom Perkin worked. Dr. Cain's most conspicuous work was in connection with his appointment as editor of the Chemical Society's *Journal*. For a time during the war he was superintendent of H.M. factory at Hackney Wick, and was for a short period manager of one of the works of British Dyestuffs Corporation. The latter post he resigned in order to return to the Chemical Society and consulting work.

The Chemical, Metallurgical and Mining Society of South Africa will hold its Fifth Annual Exhibition in Johannesburg from March 9th to 19th. The object of the exhibition is to bring before all those engaged in or in any way interested in chemistry, metallurgy and mining the latest developments and improvements in apparatus and machinery connected, therewith. Full particulars are obtainable from the Secretary, Chemical, Metallurgical and Mining Society of South Africa, P.O. Box 1183, Johannesburg.

Official Review of German Chemical Industry

An important "General Report on the Industrial and Economic Situation in Germany in December, 1920," has just been issued by the Department of Overseas Trade (Cmd. 1114, 9d.). We give below the substance of the chapter dealing with German chemical industry.

EXTRAORDINARILY little has been published during the past year concerning the German chemical industry in general and the German dye industry in particular. The German technical journals from time to time contain reports of certain new processes, but they are only comprehensible to experts, and it is extremely difficult for the layman to gauge their commercial bearing. The public utterances of men prominent in the industry, such as Geheimrat Duisberg, of the firm of Bayer & Company, of Leverkusen, hardly serve to dispel the obscurity which surrounds these branches of German industry. They vary between complaints as to the shortage of coal, the high cost of raw material and labour, and boasts as to the continued excellence of German products. While there can be no doubt that, except for those actually situated on the Rhine, the great chemical works in western Germany are unfavourably situated for fuel, they have been suffering much less from this disability during the current year than in 1919, and it is also certain that they have adapted themselves with their usual skill to existing conditions, and in spite of all drawbacks are doing a very profitable business, even although they may not be running to the full extent of their capacity.

As in so many other branches of German industry, the difficulties of the present situation have intensified the desire for further amalgamation in the chemical industry. This was manifested early this year by a combine in Upper Silesia. This has now been followed by the proposed consolidation and extension of the well-known German Dye Works Combine. This will mean the continuation of the combine until the end of 1999, which can only be dissolved by a four-fifth majority at a general meeting. It shows the great importance attached to nitrogen production that the proposal has at the same time been made for the combine to form a limited company with a capital of M.500,000,000, in order to take over the nitrogen production plants at Oppau and Merseburg.

One of the reasons why these nitrogen plants are being formed into a separate company is that, owing to their ever-increasing importance, they have become too unwieldy to be included as part of the Badische Anilin and Soda Fabrik. At the time that the combine among the great chemical works took place, all the other factories contributed towards the development of these nitrogen plants, while the loans made by the State are gradually paid off. The formation of a new company will not lead to any alteration in the running of the nitrogen works.

An Effort at Recovery

There can be no doubt that the German chemical industry has survived the worst period after the war very well, and has now consolidated. Conscious of its excellent organisation and unique experience, it is now setting out to reconquer its old markets. As far as the United Kingdom is concerned, the quantities give a fair indication of the power of production of the German factories. The latest figures available for dyes are as follows :—

Import into U.K.

August, 1920	21,758 cwt.
September, 1920	23,557 cwt.
Nine months to September 30, 1920...	117,299 cwt.*
December, 1920	30,963 cwt.
Total for year 1920	196,772 cwt.†

* Valued at £4,641,174.
† Valued at £8,374,147.

As far as can be ascertained, these figures refer mostly to finished dyes, practically all of which were imported from Germany.

Import of Aniline and Naphthalene Dyestuffs from Germany into U.K.

1912	261,049 cwt.	valued at	£1,316,084
1913	258,629 cwt.	,, ,,	£1,382,478

Import of Alizarine and Anthracene Dyestuffs from Germany into Great Britain.

1912	60,299 cwt.	valued at	£261,022
1913	60,315 cwt.	,, ,,	£271,119

A considerable export of German dyes and artificial manures to the United States of America is also reported. In June, 1920, artificial manures to the value of $600,000 were exported from Germany to the United States of America. These were, however, potash salts, a report on which follows.

Chemical Products at Frankfort Fair

One of the latest more or less comprehensive reviews of German chemical products was given on the occasion of the last Frankfort Fair. Cosmetic preparations were not shown to the same extent as in the spring, but there was an equally large number of exhibitors of all kinds of cleaning and polishing materials, while a new departure was the appearance of the raw materials which are needed for the manufacture of the latter. In addition to the manufactures of inorganic chemistry, the various products of tar distillation were shown, such as benzol, naphthalene, &c. Wood preservatives, coumarin and resins were also exhibited. The varnish trade, which uses so much of the latter, was also well represented and showed a very great variety of manufactures as well as products for drying varnish. This industry showed everywhere the endeavour to get rid of the artificial resins which became of such great importance during the war and to return to the natural resins, particularly those of French origin. An interesting exhibit was shown in the form of tetralin (produced from a combination of naphthalene with hydrogen), which is growing in favour as a solvent of resins, waxes, india-rubber, &c., and appears to be a good substitute for the expensive imported turpentine. Another advantage of tetralin is that it is not easily inflammable. Another solvent which has been put upon the market in view of the shortage of ordinary ethyl alcohol is isopropyl alcohol.

Amongst the products of organic chemistry there is a new synthetic tanning material (corinal); it is claimed for this article that it is neutral and that it acts as an insecticide.

The largest factories of pharmaceutical preparations did not exhibit, but evidence of their activity was forthcoming at the Naturalists' Congress, which had taken place at Nauheim a short time before, where the largest producers had an extremely imposing area of exhibits. At the Frankfort Exhibition there was, however, no lack of pharmaceutical preparations from other firms, and in addition to medicines for human consumption, there were a large number of veterinary preparations, particularly specifics against foot and mouth disease. Amongst the chemical apparatus exhibited, filters and diaphragms made out of kieselguhr were particularly interesting.

An announcement has been made by the Directorate of the H. J. Sloman Saltpeter Co. in Hamburg that the company intends to sell its overseas interests to a syndicate. The decision on this scheme is to be arrived at by an extraordinary general meeting in the near future. The proposed sale price is M.16,320,000.

The Potash Industry

At the beginning of the year a great improvement in the German potash industry, compared with the previous months, had taken place. This was due partly to the improved supply of coal to which the German Government had agreed in view of the importance of potash production for agriculture and for export purposes, and partly to the improvement in rolling stock, which enabled a much larger quantity of trucks to be placed at the disposal of the potash mines.

The result was that the production and distribution of potash progressed very favourably and that German agriculture could be supplied with from 80-100,000 trucks of this commodity in January and February, and was thus enabled to satisfy its requirements; in some provinces there was even an over-supply of raw potash salts. On the other hand, at that period the delivery of salts with a high potash percentage was not able to meet the demand owing to the insufficient supply of coal during the previous months and to the fact that such small production as was possible had to be used for export.

At that time representatives of the potash syndicate were *en route* to the United States of America, in order to negotiate a large contract for the delivery of potash salts at good prices.

The industry had been promised special coal deliveries by the German Government to ensure that any contract of this nature entered into could be fulfilled.

Although the summer months are always rather quiet in the potash industry, they were particularly so this year, as the industry did not remain unaffected by the general slump in most markets. No large contracts with the U.S.A. had at that time been concluded, although America was the best market. Further, the competition of the Alsace works was beginning to be felt, particularly as they were able to interfere with prices in international markets. It was, however, felt that the world's needs of potash were so great that the demand was bound to increase and the necessity of intensifying export became apparent.

Potash Consumption

For the first time since 1918 the Union of German potash producers has issued a review of the situation from January, 1919, to June 30, 1920. One of the most interesting statistics contained in this publication is that showing the consumption of pure potash since 1911 to the end of 1919, as follows :—

	Kilos.
1911	939,926,900
1912	1,009,218,700
1913	1,110,369,400
1914	903,988,300
1915	679,776,400
1916	883,975,900
1917	1,004,281,400
1918	1,001,664,300
1919	812,002,400

The decline of consumption in 1914 and 1915, due to the initial confusion of the war, was soon remedied on the adjustment of German economic life to the new conditions, but the general collapse, together with the loss of Alsace-Lorraine, is reflected in the big fall during 1919 which was particularly full of industrial and other crises.

The rising consumption after 1915 to the end of the war is noteworthy in view of the fact that export duting the same period was much reduced ; it goes to prove that the capacity of German agriculture for absorbing potash manures has not been exhausted. The export of pure potash fell from 506,000,000 kg. in 1913, to 112,000,000 kg. in 1915, and was still as low as 175,000,000 kg. in 1919. The last figure represents 21·5 per cent. of the total consumption, while in 1913 foreign countries imported 45·6 per cent. of Germany's total production. In 1913 agriculture used 90·2 per cent. of the total production of potash, this proportion rose to 95·7 per cent. in 1917 and remained at this level during 1918 and 1919; thus only 4·3 per cent. of the total German potash production during the last three years has gone to industry.

The following table shows the distribution of potash salts and pure potash in 1919 :—

	Total sales including exports.		Exports.	
	Weight of salts. Kg.	Pure potash. Kg.	Weight of salts. Kg.	Pure potash. Kg.
Total ...	4,155,104,100	812,002,400	730,815,600	174,969,800

Sales and Prices

It is also of interest to establish the relation which the sale of potash manufactures bears to the total sales ; this is shown in the following table :—

Year.	Raw salts.	Manufactures.	Total sales.	Sales of manufactures in per cent of total sales.
1880 ...	16,184,600	52,395,300	68,579,900	76·4
1890 ...	41,640,100	80,662,000	122,301,900	66·0
1900 ...	142,030,800	161,579,100	303,609,900	53·2
1910 ...	040,762,300	453,120,300	857,882,600	52·8
1911 ...	428,268,700	511,658,200	939,926,900	54·4
1912 ...	429,589,700	579,629,000	1,009,218,700	57·4
1913 ...	463,926,200	646,443,200	1,110,369,400	58·2
1914 ...	337,026,400	566,961,900	903,988,300	62·7
1915 ...	252,638,900	427,137,600	679,776,400	62·8
1916 ...	281,275,100	602,700,900	883,876,000	68·2
1917 ...	343,427,800	660,853,600	1,004,281,400	65·8
1918 ...	394,300,800	607,363,500	1,001,664,300	60·6
1919 ...	377,747,400	434,255,000	812,002,400	53·5

It will be seen that from 1910 to 1917 the proportion of potash manufactures sold increased steadily. The decline which began in 1917 and is particularly marked in 1919 is due to difficulties of production. German agriculture will probably use more and more salts in a concentrated form, partly on account of the high freight charges and partly because of the much higher prices which are being paid for agricultural products. Foreign countries, on the other hand, may be expected to give preference to potash manufactures even more than formerly.

At the outbreak of war the prices for potash salts were those fixed on June 23, 1910, but as they rapidly became inadequate, new prices were introduced on October 1, 1915 ; several subsequent increases became necessary, the last of which occurred on December 3, 1919. That these prices are still far from sufficient to cover even the cost of production is shown very strikingly by a comparison of the prices in 1914 and in 1920 of potash salts and of certain qualities of coal, iron and of foodstuffs. While the prices of potash have on an average risen by 441 per cent., those of coal have increased by 1,600 per cent., those of iron by 2,700 per cent., and those of food by 1,200 per cent., with a corresponding rise in wages of 1,000 per cent.

Further, the following table shows the increase in the prices of other artificial manures :—

Commodity.	Price per 100 kg. 1914. Marks.	1920 Marks.	Increase. Per cent.
Sulphate of ammonia 20 per cent.	26·00 ...	240·0 ...	823
Nitrolim	21·75 ...	214·0 ...	911
Thomas phosphate	3·77 ...	151·50 ...	3,919
Superphosphate	6·60 ...	214·0 ...	3,080

The question, in consequence, arises as to whether the German potash industry should charge higher rates to German agriculture or should continue to deliver to the latter under cost price, making its profits on its foreign sales. It appears that the latter course has been adhered to.

It must be remembered that the German potash industry is controlled by a syndicate which regulates production and prices, and is in fact a complete sales organisation, both for Germany and for export. It has existed for many years and was created at a time when there was a danger of over production. Since the end of the war a Potash Council (Reichskalirat) has also been formed. It is one of the typical post-war socialistic organisations, the chief function of which is to enable employers, consumers and workmen to meet and discuss conditions of labour, wages, &c.

Laboratory Balances

To the Editor of THE CHEMICAL AGE.

SIR,— We shall be obliged if you will kindly announce through the medium of your journal that we hope now to resume our service of attendance to balances in our customers' own laboratories throughout the United Kingdom—this service having been discontinued during the war owing to the extreme pressure of work in the manufacturing departments and the lack of mechanics possessing the necessary technical ability. Works chemists, analysts and all having balances under their care, who desire particulars, should communicate with us direct.—Yours, &c.,

L. OERTLING, LTD.

Turnmill Street, E.C.1,
January 27.

"Laundros"

To the Editor of THE CHEMICAL AGE.

SIR,—With reference to the article "Ammonia and Tar Products," on page 121 of the current issue of THE CHEMICAL AGE, we beg to inform you that the substance which is there styled "Rubol" has recently been re-named, and is now called "Laundros." We should be greatly obliged if you would draw attention to this change of name in your next issue.—Yours, &c.,

BROTHERTON & CO, LTD.,
JOHN RUSSELL, General Secretary.

City Chambers, Leeds, Feb. 1.

Reviews

THE YEASTS. By Alexandre Guilliermond, D.Sc. Translated by Dr. F. W. Tanner, University of Illinois. John Wiley & Sons, Inc. New York. Chapman & Hall, Ltd., London, 1920. Pp. 424, 33s.

Although this very excellent monograph on the yeasts is described as a translation of Dr. Guilliermond's, "Les Levures" published in 1912 as a volume of the "Encyclopédie Scientifique," it is practically a new treatise in which the author and translator have collaborated in bringing the subject up to date. Microbiology has advanced very rapidly in recent years, and Dr. Tanner has specially developed the biochemical changes which are fully dealt with in the chapter on the physiology of the yeasts, whilst the author has revised the sections on morphology and phylogeny, which thus renders them more valuable than in the French edition.

Some of the headings in the chapter on physiology seem strange to English readers, *e.g.*, the nutrition of yeasts is classified under "1. Mineral Elements"; "2. Nitrogenous Substances"; and "3. Hydrocarbon Compounds." Under the first heading we find that potassium phosphate plays an important rôle, after which is magnesium. Under hydrocarbon compounds we read that the yeasts being like the fungi, without chlorophyll, are not able to take their carbon from the atmosphere. They have to resort to other compounds such as sugars, aldehydes, acids, &c. No hydrocarbons are, of course, mentioned, and the author means by his headline the non-nitrogenous carbon compounds which take part in yeast metabolism. In the index a chemist will not find acetone nor glycerol mentioned, and the yields and formation conditions of these products have not been elaborated with the knowledge derived from recent work during the war.

S. R.

A SYSTEM OF PHYSICAL CHEMISTRY. Vol. II., THERMODYNAMICS. (Third Edition). By William C. McC. Lewis. London: Longmans, Green & Co., 1920., pp. viii. + 454. 15s.

Published four years ago in two volumes, Professor Lewis's treatise at once found favour among students of physical chemistry, and a second edition in three volumes speedily made its appearance. This subdivision of the work has brought with it the great advantage of allowing the present section to be revised and enlarged without necessitating the republication of the whole treatise.

Of the general excellence of the volume before us, already well recognised, it is not necessary to speak, and students of physical chemistry are to be congratulated on having within their reach a volume, at once comprehensive and concise, in which the principles of thermodynamics and their applications in chemistry are clearly laid down and discussed. The author has not only revised the former editions of this section, but has added new material dealing with MacInnes and Parker's E.M.F. method of determining the transport number of an ion, with the work of Richards and Daniells on thallium amalgam cells, and with the investigations of Tolman on centrigufal cells. He has also given a satisfactory account of the work on ionic activity and ionisation carried out by American chemists, and has dealt also with the activity of undissociated molecules. A summary of the experimental evidence for Donnan's theory of membrane equilibria is given, and an account of the concept of the micelle in electrolytic colloids.

Of special interest to the general student of physical chemistry are the sections dealing with osmotic pressure, with solutions of electrolytes, and with the measurement of affinity. All these important subjects are fully and clearly discussed. In connection with the discussion of the mechanism of osmotic pressure, the writer is glad to note that the author reaches the conclusion that the evidence points to osmotic pressure being primarily connected with the solvent and only secondarily with the solute.

The reviewer regrets to note the indiscriminate way in which the author uses the terms mole, gram-mole, gram-molecular. Surely gram-mole is a redundancy. It may also be suggested that in a book intended even for senior students it is not advisable to use without comment various values for F, namely, 96,540 and 96,500 coulombs (pp. 98 and 147). It may also be pointed out that Roozeboom's *Heterogene Gleichgewichte* is being edited and extended by Schreinemakers not by Meyerhoffer. These and a few other trifles open to criticism do not, however, in any appreciable manner impair the usefulness of the volume before us, which may be welcomed wholeheartedly as the best and most comprehensive treatment of Physical Chemistry which we possess in the English language.

A. FINDLAY.

LUBRICATING AND ALLIED OILS. By Elliot A. Evans; with a foreword by Sir C. Wakefield, Bart. (The D. U. Technical Series). London: Chapman & Hall. Pp. xiv, 128, 9s. 6d.

The subject matter included under the term "Oils" has now become so comprehensive and of such industrial significance in widely diverse fields of our economic existence that special sed monographs covering some definite area and covering it well are always to be welcomed. Mr. Evan has collected together in this small volume the more important analytical details of the physical and chemical testing of lubricating oils, in which the various tests are well exemplified by actual numerical examples. Chapters IV., V. and VI., pp. 11 to 92 on the chemical and physical tests are well done and by far the best in the book. Neither chapter II. on oil refining, nor chapter III. on the occurrence of fatty oils are sufficiently detailed to be of much value to the reader. Chapter VII. on the important problem of the oxidation of petroleum, does not include the work of very many investigators, notably Grün, Kelber, Fischer and Schneider, Franck, Ubbelohde and others who have made many important communications to current chemical literature during the last two years. In chapters IX. and X. the author writes from experience on the selection of the most suitable lubricant for various types of plant, but to the reviewer at least it appears rather unsatisfactory to list merely the most suitable grades of one particular trade brand of lubricants for the various motor car engines (pp. 112 to 114), for aeroplane motors (p. 115) and for Diesels (p. 117). There are numerous good lubricating oils on the market, and purchasers will generally buy those which conform most closely to the necessary specifications at the most reasonable prices, a factor on which a scientific monograph should not lay undue stress.

ERIC K. RIDEAL.

INDIA RUBBER GOODS MANUFACTURE. By "Factory Manager." (London: Maclaren & Sons, Ltd., 1920. pp. 484, 32s. 6d.)

This volume, by an anonymous author, bears the sub-title "A practical guide to the manufacture of Rubber Goods," and this may be regarded as a reasonably accurate description of the contents. The author is obviously a "practical man," and while he by no means denies the value of science and scientific control, he does not attempt to go beyond his own particular sphere. The keynote of the volume may be found in the preface in which it is stated that " . . . Chemical compounds and machines are mainly the instruments of the practical worker in the rubber factory; he takes them as he finds them, and makes the best use of them he can. Our author has adopted the standpoint of the manufacturer and the factory hands who carry out the operations." The substance of the book appeared originally as a series of articles in the *India Rubber Journal*, but the chapters have been revised and there are a number of useful appendices containing new and up-to-date matter. The opening chapters (I.-XI.) deal with general subjects such as factory arrangements and machinery, essentials of various departments, washing, drying, mixing, vulcanising and the raw materials of the industry. These are followed by sections on special branches of manufacture, *e.g.*, on engineering and electrical goods; matting and tiling, heels, hose, tubing, domestic goods, games and sports articles, printing and stationery goods, motor tyres, other tyres and motor requisites, &c. Finally there are chapters on management and on costing. The appendices deal *inter alia* with the most recent compounding ingredients, electricity in the industry, rubber toilet articles, various requisites for railway work, and rubber roller manufacture. In the opinion of the reviewer the book is likely to be extremely useful to works managers and others engaged on the purely "practical" sides, and can be recommended a an addition to the library of all those interested in rubber manufacture.

PHILIP SCHIDROWITZ.

Zirconia from Brazilian Ore

A New Method of Determination

A PAPER was read on "The preparation of zirconia from Brazilian ore and a New Method of Determination" by Messrs. E. C. Rossiter and P. H. Sanders (Research Laboratories, British Cyanides Co., Oldbury), on January 27, at a meeting of the Birmingham and Midland Section of the Society of Chemical Industry.

Dr. Brownsdon, who presided, said it was intended to hold a social event shortly, and to provide facilities by which members could dine together before each sitting of the session. The desire was to re-establish social arrangements such as existed in 1914.

Mr. Rossiter, who read the contribution, pointed out that one of the chief difficulties presented was the complete separation of zirconia in a pure state from iron and alumina. A simple method for this separation, and one which has been found to give practically quantitative results, is based on the precipitation of the zirconia as a basic sulphate, in which the ratio of zirconia to sulphuric acid is expressed by the formula $5ZrO_2, 2SO_3$. A similar method has been proposed by K. Leuchs, in which a basic sulphate of the formula $7ZrO_2, 3SO_3 14H_2O$ is precipitated, and he has modified this method so as to obtain a crystalline basic sulphate of the formula $3ZrO_2, 2SO_3 6H_2O$. Both these products are claimed to be free from iron, but the yield which is obtained is not stated. Another similar method is disclosed in a British patent in which a crystalline basic sulphate of the composition $5ZrO_2, 3SO_3 13H_2O$ is obtained by adding the requisite proportion of suplhuric acid to a solution of the oxychloride; this basic sulphate is claimed to be substantially free from iron, titanium and silica, but the yield obtained is not stated.

In the present investigation Mr. Rossiter pointed out that the ore used was from Brazil; it was ground fine in a porcelain ball mill before being used. During the grinding it was found that about 50 per cent. was much softer than the remainder and this was separated. The object being the commercial preparation of zirconia it was important that a comparatively ready way of decomposition be used, rather than that a complete decomposition be obtained. Two methods have been examined—fusion with caustic soda and fusion with acid sodium sulphate, nitrate-cake being used in the latter case. Fusion of the ore, previously ground to flour fineness, with its own weight of caustic soda at a final temperature of about 600 degs. yields a product which after extraction with hot water, is soluble in hydrochloric acid to the extent of 80 per cent of the ore. Fusion of the ore, with four times its weight of nitre-cake yields a product which on extraction with water yields a solution containing 50 per cent. of the ore. As it is necessary to obtain the zirconia in solution as oxychloride in order completely to separate it from the iron and alumina the fusion with caustic soda is preferred; 50 grms. of the zirconia are are mixed with 50 grms. of caustic soda and fused in an iron crucible; foaming takes place and the mixture is continually stirred until it is converted into a granular powder; and the temperature is then raised to just visible redness. The product was filtered and the insoluble washed free from alkali; the insoluble residue is treated with hydrochloric acid and the mixture evaporated to dryness. The product is then extracted with hot water and filtered. The insoluble after ignition amounts to 19-20 per cent. of the ore used and contains 61·55 per cent. ZrO_2 29.32 per cent. SiO_2, 1·10 per cent. Fe_2O_3, 1·80 per cent. Al_2O_3, 5·90 per cent. loss on ignition= 99·77 per cent. The solution contains zirconium oxychloride and iron, alumina, titanium, manganese, &c. As to the precipitation of the zirconia, he solution of the chlorides is diluted to 1½ litres, treated with a slight excess of sulphurous acid over that required to reduce the iron salts and heated to boiling. Normal sulphuric acid is then gradually added in amount equal to that theoretically required to replace the chlorine in the oxychloride or until the mixture becomes thick; after a short time the whole of the zirconia is deposited as basic sulphate. This precipitate is easy to filter and settles rapidly. To obtain zirconia from the basic sulphate it can be either dried and ignited or suspended in water, treated with alkali and the hydroxide washed, dried or ignited.

Commenting upon the properties of the basic zirconium sulphate the authors state that when dried at room temperature or at 100 deg. it has the appearance and colour of clear amber. It is then easily soluble in concentrated sulphuric acid, slightly soluble in hydrochloric acid and completely decomposed by prolonged boiling with sodium carbonate or ammonia. The hydroxide prepared by suspending the undried basic sulphate in ammonia is easily soluble in hydrochloric acid and this solution when concentrated in the water bath and allowed to crystallise yields the oxychloride $ZrOCl_2 8H_2O$, crystallising in slender needles.

Regarding the determination of zirconia in the presence of iron and alumina Mr. Rossiter stated that using a solution of zirconium oxychloride of known strength it was found that in the presence of a slight excess of sulphuric acid quantitative results were obtained and that the effect of a large excess of acid could be neutralised by dilution. A solution of pure zirconium oxychloride prepared from the Brazilian ore was boiled with sulphurous acid and precipitated by the addition of a measured quantity of N sulphuric acid. Then the precipitated basic sulphate was filtered off, washed with hot water and converted to zirconia by ignition to a constant weight.

British Overseas Trade

Co-operation Urged Between Merchants and Manufacturers

AT a political luncheon at Gatti's Restaurant, London, on Wednesday, the Right Hon. F. G. Kellaway, M.P., Minister of the Department of Overseas Trade, was the principal speaker and guest. He reviewed the condition of national commerce, and showed the importance of developing export trade.

At the conclusion of the speech Mr. F. E. Hamer (who was called on by Sir Murray Hyslop, the chairman, to support a vote of thanks to Mr. Kellaway), said that recent experience in connection with chemicals and dyestuffs had brought him frequently in contact with the responsible officials of Mr. Kellaway's department. No one could have such an experience without being impressed by the great assistance the Overseas Department was giving, both to manufacturers and to merchants, in the development of overseas trade and by the invariable courtesy and readiness with which that assistance was rendered. One recent statement of policy by Mr. Kellaway had given special satisfaction to the merchant community, namely, that the Department made no discrimination between manufacturers and merchants, between large traders and small traders. On the contrary, it aimed at assisting both and at extracting from both the largest possible contribution to national prosperity. In the present condition of national finance and commerce, the nation needed, not the development of one side of trade to the detriment of another, but the hearty co-operation of all sides in an effort to promote the national interests. Such co-operation was essential to secure what this country supremely wanted, namely, a maximum of production, the most efficient and economical distribution, and an ever-increasing absorption of British products in every market in the world.

Dyestuff Makers and Merchants

In the administration of the recently passed Dyestuffs Act, he said, it was desirable that this national aspect should be borne in mind. If the dyestuff manufacturers refused to supply British products to British merchants for export markets on the ground that they had their own selling and distributing arrangements abroad, their policy might have serious consequences. The British merchant, if prevented from supplying foreign customers with British dyestuffs, would be forced to obtain supplies from America, Switzerland, or even Germany. If these foreign goods were allowed to be imported exclusively for re-exportation they would still be goods produced by foreign instead of by British labour. If they were not admitted at all the position would be still worse, for then they might be shipped direct from Hamburg or New York, and the foreign purchaser would thus know that the British merchant had been unable to complete his order out of British productions—the worse possible advertisement against British trade. This was but one example of the need of a good mutual understanding between manufacturers and merchants in order that both might work together for their own interests and for national interests instead of one trying to benefit at the expense of the other.

Engineering in Chemical Works

By C. E. S. Place

ON January 25 before the Evening Students' Chemical Society of the Manchester College of Technology, Mr. C. E. S. Place gave a lecture on the "Application of Engineering in Chemical Works." The chair was occupied by Mr. J. Allen. Briefly dealing with the question of works organisation, the lecturer pointed out that successful industrial concerns as applied to the chemical world, must essentially be built on sound lines. Dealing with the importance of efficient boiler stations and general services, he said that a chemical works generally required a large amount of steam at a low pressure, except perhaps for stills, where a high pressure may be required. The Lancashire or two-flued type of boiler was generally used, but while this type was not most efficient, it was safe and easily managed. The thermal efficiency in a properly kept boiler station was generally about 75 per cent. To get this efficiency the boiler settings must be in first-class condition, a point which was neglected in many works. Great attention should be paid to leakages which might occur through defects in brickwork. Suitable fuel must be supplied. It had been found that efficiency decreased unless care was taken in firing and keeping the boiler plant in good condition. It might fall as low as 50 per cent., the lecturer remarking that many plants in England to-day were working at 50 per cent. In any works the boiler plant might be considered as a factory where the raw materials are coal and water, and the finished product steam. To produce this a modern steam plant should consist of boilers, superheaters, economisers, feed pumps and efficient coal and ash handling plant.

Use of Mechanical Stokers

Mechanical stokers were a matter for consideration. They were a means of saving labour and did good work, providing the fuel was of good quality. It had often been found, however, that the maintenance charges on these stokers outweighed any advantages gained by them. The control of draught was most important; natural draught was too much dependent on weather conditions. It was also very costly, as about 25 per cent. of the total heat of the fuel was required to maintain it. Mr. Place said the cheapest form of draught was the induced draught fan.

The ratio of heating surface to grate area should not be less than 25 to 1 for Lancashire boilers. If the ratio was less a great waste of fuel took place. 5 ft. 6 in. was about the maximum length of grate advisable as this was about the longest grate the firemen could keep covered properly. On long grates the back of the fire was completely uncovered, and cold air was drawn in. This reduced the furnace temperature and caused inefficiency.

An Ideal Arrangement

A very great saving might be obtained in labour charges, &c., and a much more efficient and economical boiler plant would result if the coal storage and mechanical handling plant was allowed for. An ideal arrangement was to have the coal storage on the opposite side of the railway to the boiler plant. Wagons should come forward and should be tipped into a hopper. From this hopper coal should then be elevated into boiler bunkers for early use or could be crane handled and carried to the coal storage area. From this area it could, if necessary, be transhipped to boiler bunkers by crane service to the receiving hopper, and elevated as in the case of coal supplied direct from wagon to bunker.

Dealing with the question of services, Mr. Place pointed out the importance of proper and careful consideration being given to the layout of steam pipes, as he had found in many cases such layouts were sadly neglected. This neglect he attributed to lack of proper knowledge on the part of those in charge, of the true value and definite economy which could be derived by such consideration. Dealing with the question of existing works, he emphasised the necessity of all steam and water pipes being properly lagged to avoid compensation losses, in the case of steam, and in the case of water pipes above ground the possibility of freezing in winter time.

For compressed air supply, the lecturer advocated a central air compressor station, which to a great extent make a works air supply foolproof. In qualifying this latter remark, the foolishness of single air compressor units to separate departments was pointed out.

Drawing attention to the importance of costing, the lecturer emphasised the importance of fitting meters to the various services at all points of main supply and also on all important points of branch mains. A correct allocation of steam used, he pointed out, was a large consideration, having regard to the cost of labour and fuel.

The Economic Use of Fuel

Application of the Back-Pressure System

THE second, and concluding, lecture upon the above subject was given at the Manchester College of Technology by Mr. David Brownlie, B.Sc. Hons. (Lond.), F.C.S., A.M.I.Min.E., A.I.Mech.E. (Messrs. Brownlie & Green, Ltd.).

In connection with the utilisation of steam Mr. Brownlie dealt in detail with the question of superheating. In the chemical industry little use was being made of superheaters, and it was no exaggeration to say that that industry was losing at least 5 per cent. of the coal bill by not taking proper advantage of superheating. The method of working superheaters was then explained at considerable length and slides were shown of typical superheater installations as carried out by Messrs. Daniel Adamson, of Hyde, Messrs. Superheater Units, of Swansea, Messrs. Bolton's Superheaters, Ltd., of Manchester, and Messrs. T. Sugden, of London.

The lecturer then dealt with the proper design of steam pipe circuits, stating that, in his opinion, the design and lay-out of the steam pipe circuits of the average chemical works was very poor. The ordinary chemical works had, as a rule, a particularly extensive steam pipe circuit, and it was for this reason that the design should be as good as practicable. A number of slides were shown of modern steam-pipe installations, many of which were kindly lent to the lecturer by Mr. C. L. McCarthey, of Messrs. Stewarts & Lloyds, of Birmingham.

Mr. Brownlie then dealt with the question of the losses in the chemical industry by inefficient boiler and pipe coverings. He stated that these generally were in a deplorable condition, and that at least 5-7½ per cent. of the coal bill of the average chemical works was lost on this account alone. A considerable amount of data was given with regard to the efficiency of various coverings and a number of slides exhibited, particularly in connection with modern slag wool covering as carried out by Messrs. Sutcliffe Bros., of Godley, and magnesia coverings as carried out by Messrs. Newalls Insulation Co., Ltd.

Costing for Steam Consumption

Mr. Brownlie then dealt with the question of a proper system of costing for steam consumption. He pointed out that it was absolutely necessary, for efficient working in a chemical factory, to know the exact amount of steam that went to every department in the works, so as to get a proper costing system, together also with losses in the steam-pipe circuits. To do this it was absolutely necessary to have an installation of steam meters. The general principles underlying the design of a steam meter were then explained as being generally based either on the principle of the "Pitot" or the "Venturi" types, although details of the mechanism to adjust varying boiler pressures, and also the amount of superheat, were necessarily somewhat intricate. Mr. Brownlie illustrated this portion of his lecture by slides of the "Sarco" Steam Meter and the "Kent" Steam Meter as being typical.

The lecturer then dealt at great length with the saving to be obtained by the utilisation of the "back-pressure" or "pass-out" system of power generation, which, he said, was one of the chief economies that could be effected in the chemical industry. In addition to giving a considerable amount of other data, there were also shown a number of slides explaining Messrs. Belliss & Morcom's back-pressure sets, and also modern pass-out turbine installations as installed by Messrs. C. A. Parsons & Co., Ltd., Messrs. Metropolitan Vickers Electrical Co., Ltd., Messrs. Howdens, and Messrs. The British Thomson-Houston Co., Ltd.

The question of friction losses and bad drives was also dealt with, and a large number of slides of modern pyrometer installations by the Cambridge & Paul Scientific Instrument Co.

Summing up, Mr. Brownlie stated that it was easily possible to reduce the coal consumption of the average chemical works 20 per cent. by adopting up-to-date methods of steam utilisation, and in individual cases the figure was even as high as 50 per cent.

Chemicals in Argentina

Trade Prospects Outlined

As a market for chemicals Argentina undoubtedly possesses some interesting possibilities and although British exporters have held their own in this field, there are certain directions in which trade might be increased. Local manufacturers are producing a certain proportion of the country's needs, but unless their manufacturing facilities are greatly increased there will always be an opening for certain kinds of chemicals. Sulphuric acid is made by several local firms, the sulphur used being imported as a general rule from Italy, the United States or Chile. Nitric acid hydrochloric and acids are made and a small quantity of anhydrous sulphurous acid is produced in Buenos Aires. In the vicinity of Cordeba various pyroligneous products, including acetone, acetic acid, brown acetate of lead and acetates of lime are manufactured on a small scale, but cannot as a rule be sold at competitive prices.

The present local production of tartaric acid does not nearly fill the demand and the deficiency was made up by imports from Italy, Germany, England and France. During the war the United States for the first time exported considerable quantities of this acid to Argentina. The States have also recently entered the field with citric acid, which was formerly supplied by England, France, Germany and Italy to the extent of nearly 150 tons yearly. It appears that with both citric and tartaric acids, crystals are generallypreferred by importers. Imports of carbolic acid fluctuate considerably from year to year, the majority coming from the British Isles. Such acids as boric, hydrofluoric, tannic and carbonic were imported in small quantities chiefly from Germany, while England and France supplied the remainder. During the last four years, however, a small but increasing quantity of all but carbonic acid has been imported from the United States. From the available statistics it is found that imports of boric acid averaged about 55 tons yearly, while imports of carbonic acid amounted to 20 tons. Although for some years past the average imports of tannic acid totalled 32 tons this amount has fallen off very considerably since 1914, owing to the increased local manufacture. of tannin extract. The statistics show that for the last few years the total imports of hydrofluoric acid only amounted to about 44 metric tons, while other acids not previously mentioned averaged 125 tons during the same period.

Up to 1916 Italy supplied the greater proportion of the lump sulphur requirements of Argentina. Out of a total of 2,980,000 kilos, the total imports in 1914, Italy supplied 2,928,000 kilos, the United Kingdom supplying the balance of 52,000 kilos. By 1918 our share of this trade had diminished by more than half and Chile supplied 3,423,000 kilos, while Italy supplied none. In 1919 the imports from Chile had increased to just under 4,000,000 kilos, the remainder being divided between the United States (3,094,000 kilos), Italy (72,609 kilos and Bolivia (41,000 kilos).

With regard to alum, the ammonia, potash and chrome alums are regarded as being most in demand. In the statistical reports all alums are so grouped that no data giving any accurate idea of the relative demand for the different kinds can be obtained.

Aluminium sulphate is in good demand, and is chiefly used as a coagulent for the water-purification plants of the large cities, while aluminium hydroxide is used in small quantities by glass manufacturers, and has a limited application in the making of colours for the textile industry. The average yearly imports of aluminium sulphate have averaged something over 1,000 tons. Since the war the United States have secured a large proportion of this trade, and have increased their exports to Argentina from something under 5 tons, the pre-war average, to more than 900 tons.

The United Kingdom supplies the greater proportion of the yearly average (45 tons) of liquid ammonia, but the United States have been supplying nearly 90 per cent. of the anhydrous ammonia, which is usually imported to the extent of over 500 tons. There is a fluctuating demand for miscellaneous ammoniacal products, but the yearly average has been estimated at about 40 tons. Arsenic and arsenical compounds are required for use by glass manufacturers, and also for the manufacture of insecticides, sprays and colours. Although in 1919 the importation of industrial arsenic totalled over 500 tons, the average yearly demand may be taken as a little over half that amount.

Although the pre-war imports of calcium carbide approximated 9,000 metric tons, of which Norway supplied the majority, the total imports during 1919 only amounted to 3,000 tons, of which the United States supplied very nearly 75 per cent. The manufacture of calcium hypochloride has been commenced locally, but is only being undertaken on an exceedingly small scale. Meanwhile the United States supply more than 350 tons of chloride of lime yearly out of a total of about 680 tons. Requirements of glycerine and glucose are now mainly supplied by the United States, the total yearly imports averaging 100 tons and 2,000 tons respectively. Barium sulphate is in demand to the extent of about 1,500 tons, the majority of which was supplied by Germany before the war; this trade has now entered into American hands also. Paraffin wax and resin are in good demand, the approximate figures of imports being 2,600 tons and 16,000 tons respectively. A very small quantity of stearic acid (not more than four or five tons) is imported, the bulk of the country's requirements being provided by local manufacturers.

Further Tests for Glycerine

It has been found that the German Pharmacopœia tests do not suffice in order to recognise the impurities which occur as the result of present methods of manufacture. It would be better to employ the Gutzeit test for arsenic, unless a small amount of arsenic not injurious to health is to be permitted. In the latter case the following form of the Bettendorf test in conjunction with the hydrogen sulphide test would suffice: An aqueous solution of hydrogen sulphide is poured over a few ccs. of glycerine which has been acidified by means of dilute hydrochloric acid; after several hours there should be no yellow ring. The following preliminary test may be employed: 3 ccs. glycerine are mixed with 1 cc. of a starch solution which has been coloured blue by the addition of a drop of deci-normal iodine solution, and the time required for decolorising observed; all samples which are decolorised inless than an hour, or show considerable clearing, are strongly contaminated. When mixed with an equal amount of hydrochloric acid, glycerine should not develop a foreign odour, *e.g.*, like acid or cabbage, and ought not to colour potassium iodide-starch paper. The addition of zinc dust should not produce an acid odour; a dry strip of lead acetate paper should not be coloured brown by the gases evolved, not even after long exposure. On covering over with a layer of dilute hydrochloric acid and nitric acid there should be no brown, pink or pink-violet coloration, and no canary-green coloration of the nitric acid. No coloration should take place on covering with liquid ammonia and soda solution; covering over with a layer of strong sulphuric acid should produce a brown coloration immediately, but there should be no subsequent development of yellow, pink, violet-pink, brown-violet and cornflower-blue tints. An aqueous solution of glycerine (1 : 9) should not bleach 1 cc. potassium permanganate solution (1 : 1,000) within five minutes (reducing substances). Glycerine which has been treated with a few ccs. of corrosive sublimate solution (1 : 20) should not become turbid or yield a precipitate and should remain clear when treated with a solution of lead acetate. The colour of glycerine is best ascertained by comparing a column the height of 10 ccs. in a testing glass with a column of water of the same height.—(W. Zimmermann, in *Chemisch-Technische Übersicht*, 20.11.'20. 305).

Value of Magnet Steels

In the course of a paper read before the Sheffield Association of Metallurgists and Metallurgical Chemists, at the Royal Victoria Hotel, recently, Dr. F. Rogers drew attention to the importance of the study of the magnetic properties of steels for the construction of dynamos, motors, transformers, and more especially for the permanent magnets of magnetos. Sheffield was now at the threshold of a struggle to retain the permanent magnet steel trade, which she had developed enormously since the early days of the war. Properly applied, the new magnet steels would save one-half the weight of ordinary magnetos for equal service. The germ of that steel discovery had to be credited to Japanese investigators, but it was in Sheffield that practicable and tractable steels had been evolved from it.

Plantation Rubber Processes

Chemical Treatment of Latex

A PAPER on the subject of the processes associated with Para rubber plantations was read at a meeting of the Chemical Society of the Royal College of Science on January 28 by Mr. B. I. Eaton, O.B.E., F.I.C.

In his opening remarks the lecturer said that the industry owed its origin to the seedlings cultivated in Kew Gardens from some seeds brought back from the Amazon in 1876. These seedlings had been introduced into Ceylon and Malaya, and had thus led to the establishment of plantations covering more than two million acres. After describing methods of tapping, Mr. Eaton dealt with the chemical treatment of the latex. The latex had a marked tendency to coagulate in the cup and collecting vessels, and, to avoid this premature coagulation, use was made of dilute solutions of formalin, ammonia, sodium carbonate and other alkaline substances, and finally sodium sulphite. The latter, having proved the most suitable for general use, is now employed almost exclusively.

In the low-lying levels this tendency to coagulation, which was concerned in some manner with the fermentation of the latex, was particularly marked; but by the use of these anti-coagulating agents it was possible to obtain 80–85 per cent. of the latex in fluid state. The balance of the crop consisted of lump rubber to 2–4 per cent., which is actually coagulated in the cups and transporting vessels; scrap and bark rubber, to about 9 per cent., which are obtained respectively from the latex which has dried on the trees, and from that which is contained in the bark excised from the trees, and finally earth-scrap rubber, from the latex which in rainy weather reaches the ground. The caoutchouc content of latex might vary between as wide limits as 20–50 per cent., and was influenced to some extent by the age of the tree and the tapping system employed.

Dealing with the preparation of various forms of rubber, the lecturer said the coagulation of the latex may be effected by chemical, physical or biological processes. In the chemical method one may employ all the stronger organic acids and mineral acids and most salts, the bases of which have a valency greater than one. The alkaline hydroxides are, conversely, anti-coagulating in effect. The choice of chemical coagulant depends on the cost and on any deleterious effect which may be produced in the resulting rubber. Acetic acid, in the proportion of 1 part to 1,000 parts of latex, has been found by a large number of investigators to be the best coagulant, and, being comparatively cheap, is almost invariably employed. Sulphuric acid and alum were, however, employed during the war, but both have a markedly deleterious effect on the rubber, and the use of the latter has, in fact, been prohibited by law.

The lecturer then described various methods of coagulation, referring to the use of crêping machines, which permitted the rapid drying of raw rubber. It was also pointed out that where large rolling machines were used, the coagulum in the form of sheets contained 25 per cent. of water, while that in the form of crêpe contained only 15–18 per cent. The addition of small quantities of sodium bisulphite to the latex resulted in a very fine product. Pale sheet rubber could be prepared in a similar manner, but its manufacture was inadvisable, as the sodium bisulphite prolonged unduly the time of drying.

The relative advantages of smoke drying and normal air drying were contrasted, the lecturer stating that by the former method sheet rubber could be dried completely in fourteen days, whereas the latter process occupied as much as six weeks. The vulcanisation of rubber was dealt with at some length, reference being made to the employment of sulphur monochloride in cold vulcanisation.

The lecturer concluded by giving, at the request of the chairman, particulars of appointments of scientific nature in the rubber plantations, both in Government service and in connection with private corporations, and by exhibiting a series of lantern slides and samples of the various types of rubber in the different stages of its treatment.

Forthcoming Exhibitions

EFFICIENCY EXHIBITION.—Olympia, February 10 to 26.

BRITISH INDUSTRIES FAIR.—London and Birmingham, February 21 to March 4; Glasgow, February 28 to March 11.

PHOTOGRAPHIC FAIR.—Horticultural Hall, April 15 to 23.

Dye Trade in the Netherlands

Local Manufactures Insufficient

CONSIDERABLE uncertainty exists in Holland as to the immediate future of the dye trade, states the American Consul-General at Rotterdam. He attributes the position to unstable conditions in the raw cotton market and also to increasing unrest among the cotton-mill operatives in Twente and other provinces. In addition, there has been increasing discontent with the dye situation. The production of dyes in Holland itself is comparatively small, being confined mostly to the Netherlands Paint and Chemical Factory at Delft, the Naarden Chemical Factory at Naarden, and a new concern at Amsterdam known as the Netherlands Dyestuffs Factory. In the meanwhile, the textile concerns complain that they can place no dependence upon the domestic supply of dyes for a general piece-goods business, that the dye industry in Germany has not been re-organised upon its old effective basis, and that dyes from Great Britain and the United States lack the variety obtainable in Germany before the war. The result is that most of the supplies of dye at the present time come either from Holland itself or from Germany, through Great Britain, Switzerland and the United States are furnishing an increasing supply.

Importation of Dyes

The bulk of the dyes now used in Holland come from Germany. Netherlands dealers and dyers complain of high prices, but the fact is that German dyes are now coming into this market as much because of their low cost as for their quality. On the other hand, the depreciation of the Netherlands currency as compared with American currency, works in almost a controlling degree against American dyes; British dyes, however, are aided by the currency situation.

The following figures (in metric tons) of imports during the first eight months of 1920, compared with the imports for the corresponding period of 1918 (in parenthesis) will give some indication of the present volume of trade: Aniline dyes, 1,311 (676); artificial indigo, 350 (216); other artificial dyes, 5 (nil); natural indigo, 5 (7); madder and natural dyes, 84 (89); and dyewood extract, 70 (330).

During 1919 nearly 95 per cent. of the aniline dyes imported came from Germany, the remainder being supplied by Switzerland, Great Britain and the United States in approximately equal amounts.

Of the imports of the same dyes in 1920 about 85 per cent. came from Germany, 8 per cent. from Switzerland, and the rest from Great Britain and the United States. Germany furnished practically the whole of the artificial and natural indigo in both years.

In 1919 more than half the madder came from Great Britain, Germany furnishing most of the remainder, but in 1920 Germany furnished about 90 per cent. of this material. The dyewood extract came mostly from France in both years, while about two-thirds of the other synyhetic dyes and intermediates came from Germany and Great Britain, Switzerland and the United States dividing the remainder.

A good share of these imports of all classes of dyes were re-exported. In 1919 about 20 per cent. of the aniline colours were exported—mostly to the Netherlands East Indies—while in 1920 less than 8 per cent. were re-exported. Over half of the madder was re-exported in 1919, and about a third of it was re-exported in 1920, mostly to Great Britain.

Efficiency and Industry Exhibitions

THIS month will witness the opening of two powerful trade exhibitions, each of which has been organised with the object of drawing attention to the value of British products. As we have already announced, Benn Brothers will be represented at each of these shows. A special feature of our exhibit at the Business Efficiency Exhibition at Olympia (February 10 to 26) is the unique and striking decorative arrangement of the stand, and we extend a cordial invitation to our readers to come and see it. The number is 161.

At the British Industries Fair, White City, (February 21 to March 4), Stand G 8 has been secured, where all the Benn Journals, Annuals and Scientific Books will be on view. Accommodation has been arranged which will enable visitors to examine the exhibits in comfort.

Society of Dyers and Colourists

The Identification and Valuation of Coals

AT the last meeting of the Manchester Section of the Society of Dyers and Colourists, Capt. F. S. Sinnatt, M.B.E., M.Sc. Tech., F.I.C., submitted a Paper on "Methods for the Identification and Valuation of Coals, with Special Reference to Lancashire." He drew attention to the fact that coals in the Lancashire coalfield might be considered to have a high calorific value as compared with those from other coalfields. Speaking from a broad point of view, however, no classification of the coals of Lancashire, or of the country in general, upon the lines of suitability for particular industrial purposes had been attempted. It was suggested in the Paper that although a knowledge of the chemical analysis and calorific value of the coal was of first importance, the results afforded no real indication of the properties of the coal. It was, therefore, difficult in many cases to obtain the maximum efficiency from the coal, as the conditions under which it was burned were not suited to the variety of coal being used. Purchasers should obtain an accurate knowledge of the agglutinating or coking values of the coal they were using. The efficiency to be attained by the burning of certain of the Lancashire coals depended largely upon an accurate knowledge of their caking power. The agglutinating power might be measured by determining the weight of inert matter of carefully graded size with which the coal might be mixed until the coke produced by carbonisation was no longer coherent. Capt. Sinnatt further pointed out that the weight of inert matter depended entirely upon the degree of fineness of the material, and that considerable care was required in ensuring the accurate standardisation of the size of the particle of the inert matter (Sinnatt and Grounds, *J.S.C.I.*, 15/4/1920). The agglutinating value of the important seams of coal varied between 4 and 17 with inert matter (electrode carbon) of 1/60-1/90 mesh sieve.

Capt. Sinnatt suggested that the size of the coal and a knowledge of the fines in the consignment, was of very great importance in the efficient combustion of the coal. A brief description was given of the four-banded constituents in coal, as described by Stopes, and thin sections and photo-micrographs prepared from the seams of Lancashire were exhibited, with a view to suggesting that seams of coal could be identified to some extent by the aid of the microscopic examination of a thin section. Typical examples of micro-sections prepared from the Lancashire coalfield by Mr. Lomax, of Bolton, were exhibited, and the broad proportion of the various constituents in the more important Lancashire seams was indicated. It was suggested (1) that purchasers should be prepared to purchase coal of such a nature as would fit the conditions existing in the particular works, (2) determine the type of coal which was available, and modify the conditions so as to deal with it, (3) modify the properties of the coal by mixing it with coke or other types of coal.

A discussion followed, in which the chairman (Professor Knecht) and Messrs. Hannay, Scholefield, Harrison, Crowther and Holden took part.

Oil Developments in France

THE Société Générale des Huiles de Pétrole, a subsidiary of the Anglo-Persian Oil Co., is reported to be contemplating the erection of at least two refineries capable of dealing with oil in the crude state, and producing therefrom all its various products, such as petrol, paint and dyers' spirits, burning oil, lubricating oils, fuel oil, gas oil, wax (including candles), toluol, &c., the crude oil being either obtained from French territories, or, to such extent as this may be practicable, from Mesopotamia, Persia or other foreign sources of supply. The scheme for building a pipeline from Harve to Paris for the transport of Mexican oil to a refinery to be erected at the latter place is not now regarded as a commercial proposition, partly because of the great difficulty and cost which it is now ascertained would be involved in pumping a thick oil such as Mexican for this long distance, and also because former anticipations as to a large sale of fuel oil in the interior of France are not likely to be realised now that coal can be purchased at something like normal prices, which means that some 80 per cent. to 90 per cent. of the products obtained from a refinery situated at Paris would have to be re-transported to other parts of France, the bulk of it to seaports.

British Chemical Industry

English and German Methods Contrasted

LECTURING before the Huddersfield Technical College Chemical Society on January 21, Mr. G. M. Green, M.Sc., dealt with the chemical industry, ancient and modern, in the course of which he compared the industries in this country and in Germany. He suggested that our methods were antiquated compared with those of Germany, especially in the matter of organised research and activity. He blamed the system of individuality amongst British manufacturers and the lack of appreciation, even to-day, of the chemical industry by the nation at large. He urged that manufacturers should concentrate more on unity for purposes of competition with foreign undertakings, instead of on competition amongst themselves. Much of the progress of Germany was due to the fact that the industry there was under the supreme control of men possessing not only business acumen, but high scientific training which made them be in full sympathy with the work of the laboratory. There was the closest association between engineer and chemist; research was fostered; standard types of plant were used; and there was local centralisation in different branches of the industry districts, as far as possible, specialising in heavy chemicals, intermediates, dye wares or fine chemicals. The result of this specialisation in areas reduced the cost of transport and secured economical use of what might otherwise be waste products.

The lecturer drew attention to the close association of the German banks with the industry. He pointed to our labour question as one of the biggest handicaps on progress in our chemical industries. The lecturer strongly deprecated Government control of the chemical industry in any of its branches, but urged the vast importance of the establishment of a great British chemical industry, both for the advancement of commerce and in view of possible future wars.

Tasmanian Oil

THE annual report of the Tasmanian Mines Department states that great interest has been manifested in the search for oil in Tasmania during the year, and a number of licences to search for oil for two years have been granted on Bruny Island, 12 miles south of Hobart; at Barn Bluff, Western Tasmania; and on the East Coast. Writing from Hobart, a *Times* correspondent states that since the report was issued investigations in the Barn Bluff district, about 45 miles from Sheffield, are said to have demonstrated the possibility of important petroleum supplies being obtained in that region. An analysis of samples resembling Albertite gave the following result:—Estimated yield of crude oil, 101 gallons per ton; still residue very good coke; fractional oil composition 15.1 per cent. light oil; 38.07 per cent. intermediate and heavy oil, up to and including kerosene; 44.2 per cent. heavy residual nearly a wax, in all probability a paraffin wax.

The Commonwealth Bureau of Commerce and Industry has been assisting members of the syndicate to obtain expert scientific advice as to the nature of the deposits, but its activities in the matter have ended there. It is stated that a search of mineral records has failed to discover a deposit entirely similar to the Tasmanian deposit. Albertite is said to resemble it the most, but that mineral is declared to be less rich in oil deposits. The indications, it is said, warrant the belief that oil wells will be located by deep boring.

Corrosion and Preservation of Iron

DR. J. NEWTON FRIEND continued his lectures at the Birmingham Municipal Technical School on January 28th on "The Corrosion and Preservation of Iron." He said the real quantitative study of corrosion had only been attempted within the last century, and outlined a number of methods of determining the extent to which iron corrodes. The whole method of determining the loss in weight was exceedingly valuable, but did not cover every case. Pipes, for example, might lose very little in weight, and yet "pit" badly, and so become useless. The lecturer also pointed out what a large number of factors were concerned in the corrosion of iron, such as the effect of sunlight, the depth of immersion, strain, contact with other metals; and that if a correct estimation of corrosion was to be determined all those factors must be allowed for.

The Faraday Society

Arrangements for Joint Conferences

A JOINT meeting of the Faraday Society and the Manchester Literary and Philosophical Society will be held at 36, George Street, Manchester, on Friday, February 11th, at 6.30 p.m. The meeting will be presided over by SIR HENRY MIERS, F.R.S., President of the Manchester Literary and Philosophical Society, and PROFESSOR ALFRED W. PORTER, F.R.S., President of the Faraday Society. The subject to be discussed will be "Measurements of Surface Tension" and it will be opened by DR. ALLAN FERGUSON, who will submit two papers under the title of "Studies in Capillarity": (I). Some general considerations and a discussion of methods for the measurement of interfacial tensions; (II). With P. E. Dowson, Modification of the capillary tube method for the measurement of surface tensions. Contributions to the discussion are invited from members unable to attend the meeting. A limited number of advance proofs of the papers may be available before the meeting. Applications for these should be made to the secretary.

A joint general discussion on "The Failure of Metals Under Internal or Prolonged Stress" will be held during the afternoon and evening of Wednesday, April 6th, jointly with the Institution of Mechanical Engineers, the Iron and Steel Institute, and the Institute of Metals. Members desirous of contributing papers are requested to send them to the Secretary for the consideration of the Joint Committee which is organising the discussion before March 1st next.

An exhibition will be held in connection with this meeting. Members are invited to prepare any specimens which will suitably illustrate the subject under discussion.

Swiss Dye and Chemical Production

FOUNDED in 1864 and transformed into a limited liability company in 1885, the Society of Chemical Industry at Basle now has a capital of 20,000,000 francs and gives employment to more than 2,700 hands and 530 commercial and technical employees, says Dr. A. Lankoldt, president of the company, in a recent article, published in a Swiss paper. During the last years (from 1913 to 1919) the exports of aniline dyes went up from 25 to 123.6 million francs. The export value of artificial indigo rose in the same time from 3.9 to 12.2 million francs.

Closely connected with the dyestuffs industry is the chemical-pharmaceutical industry, in which the Basle concern also participates. This branch made extraordinary progress during the war. The chemical-pharmaceutical industry of Switzerland was established at a time when a number of chemical-pharmaceutical enterprises were already in existence abroad, especially in Germany. A great deal of courage and a keen spirit of enterprise were necessary in order to take up competition with the foreign industry, the reputation of which was already established. The plan thus tenaciously grasped and carried out with far-seeing vision prospered exceedingly, and to-day we may look with pride and happiness on the rapid and successful development of our native chemical-pharmaceutical industry. The factories were soon in a position to venture on independent labour in certain domains of pharmaceutical chemistry, and the preparations they have turned out have acquired a good name all over the world. The export figures for pharmaceutical articles and drugs, which was 17,687,385 francs in 1913, went up to 26,533,000 francs in 1919.

Nearly all the electro-chemical manufacturers produced abroad are turned out in Switzerland too. The old methods based on chemical processes have been replaced by the electrolytic process, such as the manufacture of metallic sodium, caustic soda, chlorine, chloride of calcium, together with a number of other inorganic and organic derivatives of chlorine. We may further mention the manufacture of oxygen hydrogen, nitric acid, hydrocyanic acid, nitrate of urea and their derivates, then the persulfates, perchlorates, calcium metal, calcium acid, silica, ferro-silica, ferro-chrome.

Workers in the CHEMICAL AND SALT TRADES at Northwich have been placed on short time work.

The German Dye Litigation

Hearing Again Adjourned

BEGINNING on Monday, Mr. Justice Russell in the Chancery Division, in further hearing the various claims in the heavy dye litigation for damages for the non-delivery of dyestuffs, has been engaged hearing speeches on behalf of the claimants.

The substance of these was that the controllers of the six companies that had been wound up under the Trading with the Enemy Acts were not discharged from fulfilling the contracts, because it did not involve trading with the enemy, that the contracts wer not frustrated or dissolved by the outbreak of war, that the companies were English entities which, having established their independence of German control so far as income tax was concerned had also done the same for the purpose of these proceedings, that they were in any case released from German control the moment war was declared, and that the controllers in what they did while in charge of the affairs of the companies, acted on behalf of the companies and not on behalf of the State.

The hearing was again adjourned.

Australian Oil Enterprise

THE following communication has been issued by the Agent-General of Western Australia:—

According to papers laid before the Parliament of Western Australia by the Minister for Mines (Mr. J. Scaddan), the Anglo-Persian Oil Company, Limited, is proposing to engage in oilmining in that State. It was claimed in these papers that the company was entirely British, that the Imperial Government held two-thirds of its ordinary capital and dictated its policy, and that its aim was to develop oilfields within the Empire, and so make Britain independent of foreign supplies.

The papers include a telegram from the Agent-General in London to the effect that the company offered to form a Western Australian Company with a capital of £100,000, of which £50,000 would be available for geological survey and boring. The company required legislation to enable leases of not less than 100,000 acres in the aggregate to be available either on Crown or private lands, and also an assurance that the necessary Bill would be introduced in the next ensuing Session of Parliament.

To this telegram the Minister for Mines cabled in reply that an oilmining Bill would be introduced in the next Session. He was unable, he added, to consider leases larger than 640 acres each, with two additional leases of 40 acres each, although larger areas were probably necessary for prospecting.

The Agent-General replied that the company was willing, on the advice of Sir John Cadman and the British Admiralty, to try to find oil in Western Australia, but required large concessi ns similar to those they had received in other parts.

Grants for Scientific Research

Dr. Stephen Miall, in his "London Letter" to the current issue of the *Journal of Industrial and Engineering Chemistry*, refers to the recent action to prevent Brunner, Mond & Co. from contributing £100,000 in aid of scientific research. "The action," he writes, "was dismissed, and I have not heard that the plaintiff has any inclination to appeal. Had the decision been the other way, the case would probably have been taken up to the House of Lords, and if such a gift had there been held to be illegal there was talk of introducing a Bill in Parliament to make all such gifts lawful. Indeed, the Federal Council for Pure and Applied Chemistry had already sounded a few members of Parliament to secure their assistance. An adverse decision would have been a very serious blow to British chemistry, for our universities cannot train sufficient chemists without such generous donations, and private individuals in this country are, since the war, not so comfortably situated as to find the necessary funds themselves."

Damage estimated at nearly £30,000 was caused by fire last Sunday, at the premises of J. & J. WYLIE (LEITH), LTD., oil cake and chemical fertiliser merchants, West Bowling Green Street, Leith. There were several explosions due to the bursting of barrels containing ammonia.

Export of British Dyestuffs

The Question of Exclusive Agencies Abroad

THE Chemical & Dyestuff Traders' Association announces in a circular to members that negotiations are proceeding between the Association and the Board of Trade in reference to the refusal of certain British dyestuff manufacturers to supply British merchants with their products for export on the ground that they have their own selling and distributing arrangements abroad. In one case, it is stated, where supplies of synthetic indigo were refused by a British concern for export to China, the order has been placed with a foreign firm, which has accepted it.

The Board of Trade, in replying to the Association's representations, states that it is not responsible for the management of the dyestuffs concern in question, and it is not acquainted with the details of their selling arrangements in foreign markets, but as the complaint alleges that, under certain of these arrangements, orders are being diverted abroad, inquiry is being made of the company.

Metallurgical Chemists

THE Council of the Sheffield Association of Metallurgists and Metallurgical Chemists has on several occasions during the past year considered whether any steps should be taken to amalgamate their association with one of the several societies dealing with the economic position of engineers or applied science workers. For a number of reasons the Council has formed the opinion that any such affiliation would be against the interests of its association, which is primarily concerned with promoting the diffusion of knowledge, and stimulating discussion among the members, while at the same time doing everything possible to raise the professional status of the applied science worker. Strictly economic matters, such as the regulation of salaries and conditions of service generally, do not appear to come within its scope, and could hardly be included without producing very important differences of attitude among the members, which might, and probably would, lead to internal stress and eventual rupture. The Council has therefore issued an announcement that in their view the association should continue on its present lines, but that any member wishing to join additionally some other association as a means of obtaining economic benefits should be perfectly at liberty to do so.

Calendars Received

We have received from J. C. Oxley, of 83, Swan Arcade, Bradford, sole selling agent for J. C. Oxley's Dyes & Chemicals, Ltd., an artistic calendar for 1921. On each sheet is a humorous drawing in colour by Harold Farnshaw, executed in an original and pleasing manner. From L. B. Holliday & Co., Ltd., of Huddersfield, we have received a striking calendar, the back of which contains a useful list of the company's agents abroad. The Broken Hill Proprietary Co., Ltd., of 320, Collin's Street, Melbourne, send us a handsome production measuring 24 in. by 18 in., containing an interesting set of 12 views illustrating parts of the company's plant and some of the operations in producing iron and steel. These views are so interesting that we are in accord with the company's suggestion that when the calendar has served its usefulness the views, if framed, would form an instructive set for the office or works. A handy little pocket calendar reaches us from the London Dye Manufacturing Co., Ltd., of 86/94, High Street, Stratford, E.15.

Recent Wills

Mr. R. Mumford, of Wyndham Street, Bridgend, Glamorganshire, chemist and druggist, a former president and secretary of the Cardiff Chemists' Association £2,108

Mr. H. T. Hines, of Norfolk House, Danvers Road, Hornsey, N., chemist and druggist, a member of the East London Pharmacists' Association ... £8,230

Mr. G. J. Knight, of 452, Edgware Road, London, W., chemist and druggist, a director of the Chemists' Defence Association, Ltd..... £13,302

Lord Murray of Elibank, chairman of the Anglo-African Petroleum Syndicate, Trinidad Petroleum Development and the Whitehall Petrol Corporation £37,895

Publication of Papers

AT a meeting of the Liverpool Section of the Society of Chemical Industry on January 24, the chairman, Dr. E. F. Armstrong referred to the question addressed by the Council to the Sections with regard to the copyright of papers read before the Sections. It was felt by the Council that papers read before the Society should not appear at any great length in the Press until such time as they had been in their own Journal. They had been advised that they could only maintain the copyright by taking such stringent steps as the exclusion of strangers from the meetings, and they had to consider what action should be taken. The chairman said that personally he thought they had been treated in a very courteous manner by the Press. They had seen the Press reports of the proceedings of the Liverpool Section, and they had been very fair, and were published with celerity. He said he would like things to go on as they were, but invited a free expression of any dissentient views. As no other views were expressed the chairman said he would assume that his view was agreed to; the question would be considered by the Committee at a later date.

German Chemical Exporters

The following statement of its terms of sale has been published in Argentina by a large German firm exporting chemicals and drugs: "In regard to our conditions of sale, we must demand payment against delivery of documents by reason of the present economic conditions, The unfavourable state of German exchange carries with it a great risk since we sell in Swiss francs. Should our exchange improve, we will experience a loss which may be very considerable between the date of the invoice and receipt of payment against documents. By giving credit to our clients this risk would be too great, and we would be obliged to invoice in German marks, leaving to our customers all the risk of the exchange, a thing which is not to their interest. The payment of our invoices made out in Swiss francs may be made, according to the desire of the client, also in marks or American dollars at the exchange of the day."

Netherlands East Indies Exhibition

BRITISH manufacturers and exporters who seek to develop trade in the Netherlands East Indies, one of the most lucrative markets in the world, and one that is by no means over-supplied and over-developed, should be interested in the announcement that the Second Netherlands East Indies Fair is to be held at Bandoeng (Java) from September 19 to October 9 of this year. The fair will be international in character and will offer manufacturers an opportunity of exhibiting wares of all kinds to a large number of potential buyers in the East.

Preliminary arrangements are well forward, and a booklet setting forth all details, in English, is being prepared by the British Chamber of Commerce for the Netherlands East Indies, to whom, at 38, Dover Street, London, W. 1, all enquiries in connection with this Fair should be addressed.

Speaking on Monday night at a University Board dinner given by the Lyceum Club, Piccadilly, to celebrate the ADMISSION OF WOMEN TO THE CHEMICAL SOCIETY, Sir William Tilden said the time would come when chemists would realise that their subject was illimitable. The idea that predominated at the middle of the last century that research was exhausted and disappeared, never, he hoped, to return. Sir William Pope welcomed the advent of women to the Society, and said that it had always been his conviction that all interested in the work should be admitted.

The Report for 1919 on the Federated Malay States refers to the satisfactory results obtained from investigations on RUBBER SEED OIL. It is stated that a satisfactory product can be obtained from freshly collected seeds, while considerable progress has been made in the work of refining the oil. The chief remaining problem is to find a means of arresting the deterioration of the seeds during storage, as it has been found that seeds stored for any length of time produce an oil with a high content of free fatty acids, which renders it unsuitable for most purposes.

From Week to Week

Advices from Dominica state that a local firm proposes to INSTALL A LARGE CITRIC ACID PLANT.

The death is announced of Mr. William Waters, chemical manufacturer, of Renfrew.

The Council of the Chemical Society have nominated SIR JAMES A. WALKER to succeed Sir James J. Dobbie as president.

Sir Ralph Ashton, J.P., a director of Midland Coal Products, Ltd., was found dead at his Reigate residence on January 28.

The Secretary of State for the Colonies has appointed Mr. E. W. Abbott as LABORATORY ASSISTANT for the Gold Coast.

During last year the employees of NOBEL INDUSTRIES, LTD., Ardeer, contributed £703 18s. 2d. to local charities.

A PETROLEUM SEEPAGE is reported to have been discovered near Derby, Western Australia.

Sir J. J. Dobbie, who is in his 69th year, has been President of the Chemical Society and the Institute of Chemistry.

DR. W. R. WHITNEY, director of the research laboratories of the General Electric Co., Ltd., has been awarded the Perkin Medal for 1921.

It is proposed to place a memorial in the parish of Tiverton, Bath, to commemorate the services of THE LATE MR. J. W. GATEHOUSE, a former city analyst for Bath.

A MANGANESE MINE has been discovered at Malempré, in the province of Belgian Luxembourg. The Government has authorised its immediate exploitation.

A process for the REDUCTION OF TUNGSTIC ACID into tungsten powder and molybdenum sulphite into metallic molybdenum will be exploited by a Norwegian firm.

The salary of the MANAGER AND CHEMIST of the Sheffield sewage disposal works has been increased to £950, rising to £1,250.

The British Non-Ferrous Metals Research Association announces the change of its office address to Athenæum Chambers, 71, Temple Row, Birmingham.

The death is announced at the age of 70, of PROFESSOR BOURGUELOT, of the French Academy of Sciences, and author of many scientific works.

According to an American Consular report, the possibility of using RUM AS FUEL in British Guiana has been seriously discussed there.

The usual monthly meeting of the Chemical Industry Club will be held on Monday evening, the 21st inst., at 8 p.m., when Mr. W. Cullen will give an address on "The Union of South Africa."

The Japanese Government has informed the International Anti-Opium Association at Pekin that it has definitely decided entirely to ABOLISH THE OPIUM MONOPOLY system at Tsing-tau and in the Kwantung leased territory.

At a dinner of the Institute of Cost and Works Accountants last week LORD LEVERHULME advocated, as a substitute for E.P.D., a tax on turnover of modest amount, which should be passed on to the consumer.

Speaking on Tuesday at a meeting of the East India Distilleries and Sugar Factories, Ltd., Mr. E. S. ORMEROD said the chemical business had done well, and had shown a considerable increase in profit over last year.

A company, under the style of the Mineral Salts Co., has recently been incorporated at Salt Lake City, Utah, for the purpose of EXTRACTING CHEMICAL PRODUCTS FROM THE WATERS of the Great Salt Lake.

At the annual meeting of the Manchester Chamber of Commerce, Mr. C. Roberts was re-elected chairman of the CHEMICAL AND ALLIED TRADES SECTION. Dr. Rée was elected vice-chairman, and Mr. F. P. Bayley honorary secretary.

DR. J. N. PRING, Reader in Physical Chemistry at Manchester University, has been appointed to Woolwich Arsenal, where he will have charge of the physical chemistry branch of the research department.

On Tuesday before the Sheffield Association of Metallurgists and Metallurgical Chemists, PROFESSOR R. V. WHEELER gave a lecture on "Composition of Gas in Relation to the Steel-Making Processes."

An announcement has been made by the NITRATE PRODUCERS' ASSOCIATION that under no circumstances will prices for delivery from July, 1921, to March, 1922, be fixed at a lower figure than 14s. per quintal. The actual price will, however, not be announced until May or June.

The CONTROLLER, EXPLOSIVES AND CHEMICALS SECTION, Disposals Board, has remaining for disposal quantities of nitric and sulphuric acids, benzyl bromide, calcium nitrate, calcium silicide, chloropicain, ferro-silicon, picric acid, potassium perchlorate and methyl acetate.

At a joint meeting of the Society of Chemical Industry with the Institution of Mechanical Engineers to be held at the rooms of the latter, Storey's Gate, Westminster, S.W., on Friday, March 4th, at 6 p.m., M. PAUL KESTNER will read a paper on "Degassing and Purification of Boiler Feed Water."

It is estimated that the DAMAGE CAUSED BY FIRE at the Port Pirie Smelting Works, South Australia, may reach £250,000. The works have been closed for an indefinite period and this may lead to the stopping of work at the Broken Hill mines.

RICH VEINS OF COPPER ORES are reported to have been located in the Oulanka River Valley in Northern Finland. It is stated that the Finland Copper Co., together with the Salla Mining Co., have purchased the claims with a view to working them.

The French Government is reported to have made a grant of 5,000,000 fr. for the DEVELOPMENT OF PHOSPHATE MINES in French Morocco. It is also stated that a similar amount will be expended in the provision at Casablanca of warehouses and handling equipment for phosphates.

The Commission of Conservation states that in Australia a syndicate has been formed "to mine, process and deliver" LIGNITE throughout the Commonwealth. Mining operations have been commenced and a pulverisation plant has been erected near Melbourne.

With reference to the report that the Profiteering Sub-committee will state that THE PRICE OF NO. 1 GRADE PETROL should be reduced from 3s. 5½d. to 2s. 10½d. per gallon, it is stated in the petrol trade that there is no intention to make any such reduction at present.

At Oxford, last week, a statute was carried by which the name of Mr. Edward Whitley, M.A., Trinity College, will be permanently associated with the Professorship for which he has provided endowment, so that it will in future be known as the WHITLEY PROFESSORSHIP OF BIO-CHEMISTRY.

On the nomination of the Committee of the Chemical Engineering Group, Messrs. C. S. Garland, C. J. Goodwin, J. W. Hinchley, W. R. Ormandy, and J. A. Reavell were elected REPRESENTATIVES OF THE SOCIETY OF CHEMICAL INDUSTRY on the Chemical Engineering Committee of the British Engineering Standards Association.

The London Inter-Collegiate Scholarships Board announces that 23 SCHOLARSHIPS AND EXHIBITIONS, of an aggregate total value of about £2,450, open to men and women, and tenable in the faculties of arts, science, medical sciences and engineering of University College, King's College, East London College and Bedford College, will be offered for competition on Tuesday, May 3.

Sir Frederick Black, K.C.B., President of the Institution of Petroleum Technologists, has consented to distribute the PRIZES AND CERTIFICATES gained by students of the Sir John Cass Technical Institute during the past session. The distribution, which will take place on Thursday, February 10th, will be followed by an address by Sir Frederick on Liquid Fuel in Peace and War.

The Research Association for the BRITISH INDUSTRY has been approved by the Scientific and Industrial Research Department as complying with the conditions laid down in the Government scheme for the encouragement of industrial research. The secretary of the committee engaged in the establishment of this association is Mr. Frank S. Cathro, 1, Royal Exchange Place, Dundee.

The Lords Commissioners of the Treasury have appointed SIR ROBERT ROBERTSON, K.B.E., F.R.S., D.Sc., Director of Explosives Branch, Research Department, Woolwich, to be Government Chemist in succession to Sir J. J. Dobbie, who has retired. Sir Robert Robertson, who was born in Cupar in 1869, was formerly chemist in charge of the laboratory at the Royal Gunpowder Factory, Waltham Abbey, and is the inventor of new explosives and processes.

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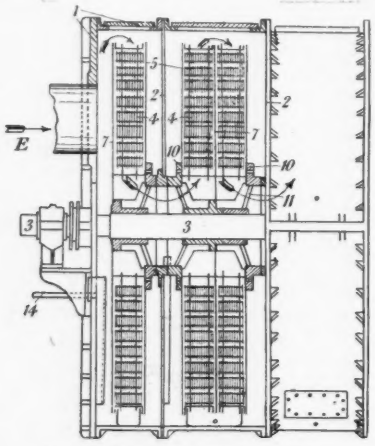
Patent Literature

Abstracts of Complete Specifications

155,859. GAS WASHER AND PURIFIER. G. Coune, 9, Rue du Cerf, Forest-lez-Bruxelles, Belgium. Application date, April 30, 1919.

The apparatus is for washing and purifying gases more particularly to extract by-products such as ammonia and naphthalene, cyanide, benzol, or the like. A shaft 3 is mounted in external bearings so as to rotate in the axis of a fixed horizontal drum 1. The shaft carries iron naves 6 to which rings 10 are secured by means of arms 11, while sheet iron plates 5 are mounted on the rings 10. Similar plates 7



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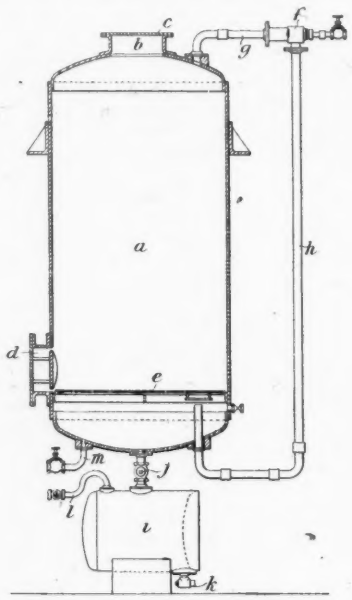
between the plates 5 are secured directly on the naves, and bundles of wooden blades are secured between the plates 5, 7, so as to form a series of rotating wheels separated by fixed transverse partitions 2. The drum is half filled with water or other liquid which may be caused to circulate through the apparatus by inlet and outlet pipes 14. The gas to be treated enters by the pipe 15 and passes through the wetted wooden blades 4 of each wheel in succession, first outwards and then inwards as shown by the arrows, and finally leaves the drum through a similar outlet at the opposite end.

155,866. SOAP POWDERS HAVING A HIGH PERCENTAGE OF LIQUID FATS AND OILS, PROCESS FOR PRODUCING. W. J. Mellersh Jackson, London. (From De Nordiske Fabriker De-no-fa Aktieselskap, Karl Johans Gate 41, Christiania. Application date, July 25, 1919.

Liquid fats and oils, especially drying oils and train oils, have not been employed in the manufacture of soap powders on account of the difficulty of drying and grinding without the addition of a considerable amount of soda. It is now found that soda soaps of these oils are easily ground and preserved if they are highly concentrated. The soap is manufactured in the usual manner and then heated in a boiler to 180°-200° C. under the corresponding pressure, either with or without alkali. The boiler valve is then opened until about 10-25 per cent. of the water distils off while the pressure is maintained in the boiler. Under these conditions polymerisation of the unsaturated acids takes place and the resulting soap may be ground.

155,863. FAT, WAX, OIL, GELATINE AND THE LIKE, PROCESS AND APPARATUS FOR THE EXTRACTION OF—FROM MATERIAL CONTAINING THE SAME. Ernest Scott & Co., Ltd., 72, Oxford Street, London, W.1, and J. Macgregor, 19, Waterloo Street, Glasgow. Application date, July 17, 1919.

Fats, oils and the like are extracted from material by circulating steam continuously and repeatedly through them without passing the steam through a drying apparatus. The material is introduced into a vessel *a* through the opening *b* which is then closed by a cover *c*, after which steam is introduced through the jet compressor *f* and pipe *g* into the top of the vessel *a*. The steam passes downwards through the material and liquefies fats, &c., which flow downwards through a perforated false bottom *e* and valve *j* to a collecting vessel *i*. The vessel *i* is provided with an outlet *k* and a valve controlled steam inlet *l*. The steam is returned from the bottom of the vessel *a*



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through the pipe *h* to the jet compressor which raises its temperature and pressure and compensates for losses due to condensation. The jet compressor may be replaced by a mechanical compressor, and a superheater may be introduced into the circuit.

155,895. PEAT, TREATMENT OF. D. B. MacDonald, 33, Vulcan Road, Leicester, and The Densified Peat, Fuel and Products, Ltd., 6, Broad Street Place, London. Application date, September 20, 1919.

Wet peat is pulped, reduced to a homogeneous mass, and treated in an extrusion press to compress the mass and dispel the occluded air. The compressed substance is cut into blocks and dried at 90° F., when it forms a hard dense fuel. Reference is directed in pursuance of Section 7, Sub-section 4 of the Patents and Designs Acts 1907 and 1919 to Specifications 1216/1873; 3536/1877, 6704/1887, 25,627/1897, 2859/1901, and 6153/1902.

155,945. LEAD SULPHATE, PROCESS FOR MAKING. P. A. Mackay, 70, Lombard Street, London. Application date October 18, 1919.

The object is to manufacture lead sulphate direct from metallic lead. It is known tht metallic lead may be converted into lead sulphate by heating with strong sulphuric acid to about 260° C., but at this temperature considerable volatilisation of the acid takes place and materials of construction are subject to rapid deterioration. It is now found that lead is soluble in oleum at temperatures below 150° C., and that the reaction when once started will proceed with heating to about 100° C. or even without further heating. If the reaction is carried out in the presence of an electro negative metal such as mercury, copper or silver, solution takes place at 90°-100°C., with a violent exothermic reaction. The lead may be coated with the electro negative metal by treating it with a solution of sulphate of mercury or copper. The lead sulphate is finally precipitated by diluting with water. If the lead contains bismuth or silver these metals remain in solution when the lead sulphate is precipitated.

156,029. GAS, RETORT FURNACE FOR USE IN MAKING. B. R. Pfeifer, Jessie, North Dakota, U.S.A. Application date, March 20, 1920.

The object is to produce gas, creosote, tar, &c., from straw and other vegetable material. A horizontal retort is provided with a number of horizontal flues in the upper part opening at one end into a furnace housing and at the other end into a discharge flue. The retort is charged with the material to be treated and is heated directly by the furnace below, and by the hot gases which pass through the flues. Gas is drawn off at the top and liquid products at the bottom.

156,034. COKE OVENS. E. C. R. Marks, London. From Société Franco-Belge de Fours à Coke, 100, Avenue de la Toison d'Or, Brussels. Application date, April 12, 1920.

Horizontal coke ovens are arranged side by side with heating flues in the walls and longitudinal regenerators below. The vertical heating flues are divided into independent groups composed of two adjacent flues, and fuel gas is admitted continuously at the top between the flues. Air for combustion is heated in the regenerators and then passes up into one of each pair of flues, and then through lateral openings into the other flue of each pair where it meets the gas; the products of combustion descend through this flue to a hearth flue and thence to the regenerators. After a period of working in this manner, the hot air for combustion is diverted into the other flue of each pair and passes through the openings into the adjacent flue, where it meets the fuel gas, which is still admitted continuously at the top. The openings between the flues may be regulated so as to regulate the length of the flame and the intensity and point of application of the heating to the charge to be carbonised.

NOTE.—The following specifications which are now accepted were abstracted in THE CHEMICAL AGE when they became open to inspection under the International Convention :—127,590 (Soc. Franco-Belge de Fours à Coke), relating to horizontal coking ovens, see Vol. I, p. 230; 135,186 (Aktiebolaget Ferrolegeringar), relating to manganese or manganese alloys, *see* Vol. II, p. 130; 137,071 (Norsk Hydro-Elektrisk Kvaelstofaktieselskab), relating to concentrated nitrous gases and nitric acid, *see* Vol. II, p. 261; 137,827 (C. A. Fesca and Sohn), relating to centrifuges, *see* Vol. II, p. 338; 138,924 (New Jersey Zinc Co.), relating to zinc oxide, *see* Vol. II, p. 479; 139,147 (L.A. Jaloustre, Z. Kheifetz and M. Warchavsky), relating to phenol-aldehyde condensation products, *see* Vol. II, p. 479; 145,397 (C. A. Fesca and Sohn), relating to centrifuges, *see* Vol. III, p. 268; 145,600 (P. Goldberg), relating to electrolytically separating copper and nickel, *see* Vol. III, p. 293; 145,732 (F. Krupp Akt.-Ges.), relating to acid-resisting receptacles, *see* Vol. III, p. 293.

International Specifications not yet Accepted

154,153. SYNTHETIC TANNING AGENTS. Chemische Fabriken Worms Akt.-Ges., 28, Mainzerland-Strasse, Frankfurt-on-Main, Germany. International Convention date, November 18, 1919.

Phenol or carbolic liquor is condensed with formaldehyde or acetaldehyde and sodium bisulphite at ordinary pressures and at temperatures up to 100°C. These products may be used as tanning agents and may or may not be mixed with other tanning agents or metallic salts.

154,157. INDIA-RUBBER SUBSTITUTES. P. Balke and G. Leysieffer, Troisdorf, near Cologne. International Convention date, March 19, 1919.

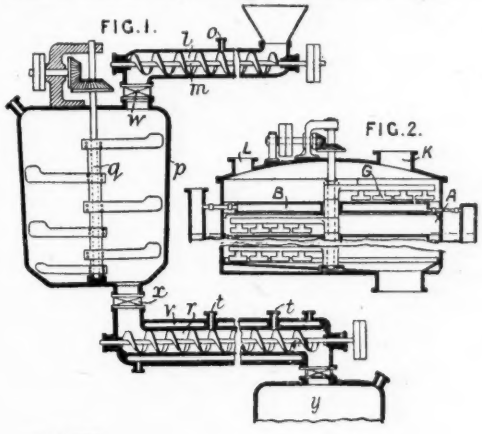
Nitrocellulose, acetyl cellulose, or other cellulose derivative in liquid form, with or without a solvent, is mixed with trichlorethyl-acetanilide, ethyl-acetanilide, triphenyl phosphate, acetic acid glycerine ester, phthalic acid dimethyl ester or other gelatinising agent in a larger quantity than is necessary for gelatinising purposes. Organic or inorganic filling materials, *e.g.*, barytes, are also added, the mixture is heated to expel water, and then moulded under pressure at a temperature of about 130°C.

154,162. SYNTHETIC TANNING AGENTS. Chemische Fabriken Worms Akt.-Ges., 28, Mainzerland-Strasse, Frankfurt-on-Main, Germany. International Convention date, August 20, 1917.

The process is similar to that described in 154,153, except that "cellulose extract" is also added to the product in addition to other tanning agents or metallic salts.

154,170. RECOVERING HYDROCHLORIC ACID IN GLUCOSE MANUFACTURE. D. Terrisse and M. Levy, 61 *bis*, Route de Lyon, Geneva. International Convention date, November 15, 1919.

The acid-saturated mash obtained in the manufacture of glucose according to the process described in specification 143,212 (*see* THE CHEMICAL AGE, Vol. III, p. 137) is distilled under partial vacuum in acid-proof receptacles to recover the hydrochloric acid. In one form of apparatus the mash is placed in a horizontal drum rotating on a hollow, fixed shaft through which hot water is circulated. The acid is supplied through a pipe passing through the hollow shaft, and excess of acid is distilled off through a similar pipe. The surface of the hollow shaft is kept clear by means of scrapers carried



by the drum. In another form, acid is supplied by the pipe *o* to the material in the mixing tube *l*, and the mixture is conveyed to a receptacle *p* where it is stirred by a revolving device *q* and heated. The mixture then passes into the tube *r* having a hot-water jacket *v*, and excess of acid passes off through a pipe *t* connected to a vacuum pump. Glucose is finally extracted in the vat *y*. In another form, the raw material is saccharified and supplied to a cylinder *A* through the inlet *K*. The material is spread over hollow plates *B*, through which hot water is circulated, by means of revolving paddles *G*, which also cause it to pass through radial slots in the heating plates to the plate next below. The vapour is drawn off through the outlet *L*.

154,182. LIQUIDS, TREATING WITH GASES. P. W. Webster, 1,469, Roosevelt Avenue, Pelham Manor, New York, and V. K. Boynton, 330, West Fifteenth Street, New York. International Convention date, November 20, 1919.

Liquid to be treated is placed in a vessel having a bottom of porous silicious material known as "filtros," and gas is forced upwards through the material so that it passes through the liquid in a very finely divided form. The apparatus may be used for treating the sludge acid obtained by the action of sulphuric acid on mineral oils, by passing air or gas through it at a temperature of about 1,000°F. and pressure of 2 lb. per square inch. Water is driven off, and the air acts on the hydrocarbons to form volatile saturated hydrocarbons. The apparatus may also be used for concentrating sulphuric acid. Acid of 40°Be. strength may be concentrated to 64° Be. by passing the combustion products of fuel oil at 1,200°-1,400°F. through it, when the temperature of the acid is raised to about 249°F.

154,213. CHEMICAL REACTIONS, FACILITATING BY RADIATIONS. E. Statineanu, Cressy-Onex, near Geneva. International Convention date, November 22, 1919.

An apparatus is described by which a gas may be subjected

to the action of ultra-violet, Lenard, Becquerel, or Röntgen rays, and its reaction with other substances is thereby facilitated. The process is applicable to the hydrogenation of unsaturated fatty acids or glycerides, unsaturated hydrocarbons; quinone, or *p*-cresol; the reduction of alcohols to hydrocarbons, fatty oxyacids to fatty acids, aliphatic aldehydes to alcohols, oxyaldehydes to aldehydes, nitriles to amines, cinnamic acid to hydrocinnamic acid, nitrobenzene to azoxybenzene, azobenzene, hydrazobenzene and aniline, and nitrobenzene to phenylhydroxylamine; also to the synthesis of ammonia and hydrazine.

LATEST NOTIFICATIONS.

157,318. Process of and apparatus for low temperature carbonisation of materials. Polysius, G. (Firm of). February 1, 1918.
157,329. Process of producing glyaxol. Wohl, A., and Braunic, K. June 29, 1916.
157,401. Methods of removing or decreasing objectionable odours from treated oils. Dupont De Nemours & Co., E. I. June 13, 1918.
157,426. Carbide receptacle for acetylene gas generators subdivided into superposed compartments. Margreth, J. August 11, 1915.
157,715. Process for the treatment of waste sulphuric acids. Deutsche-Luxembrugische Bergwerks-und Hütten Akt. Ges. May 12, 1916.
157,746. Process for the recovering nitrogen in the form of ammoniac from peat. Brat, P. October 21, 1918.
173,793. Process for the recovery of benzol hydrocarbons from coke-oven gas. Raschig, F. November 13, 1913.
157,808. Process of and oven for the continuous distillation or gasification of organic matter or minerals containing organic matter. Rippl, F. August 25, 1915.
157,854. Manufacture of phlorobutyrophenone phloroisbutyrophenone and their homologues. Fabwerke Vorm. Meister, Lucius, and Bruning. November 3, 1917.
157,860. Manufacture of zinc white. Clerc, C., and Nihoul, A. November 15, 1919.
157,879. Production of barium chloride Mathieson Alkali Works, Inc. January 20, 1920.
157,971. Method of producing steinholz from magnesia and magnesium salts. Wollin, E. March 12, 1914.

Specifications Accepted, with Date of Application

141,352. Electric furnaces. E. Assie. August 9, 1917.
141,656. Heating of material or the performance of chemical processes in electrical furnaces, together with apparatus intended therefor, Method for. Aktiebolaget Kvafveindustri. April 12, 1919.
144,656. Anthracene, Process for the purification of crude. Kinzlberger & Co. March 31, 1917. (Addition to 144,648.)
145,444. Washers for classifying coal, minerals or the like. L. Malecot. June 18, 1918.
145,803 and 146,409. Centrifugal pumps for acids. Chemische Fabriken vorm. Weiler-ter Meer. September 28, 1916, and November 19, 1917.
147,689. Copper sulphate, Manufacture of. R. E. Bea. August 3, 1917.
156,812. Gas manufacture. G. Helps. May 17, 1917.
156,835. Rotary furnaces. F. Derneden. June 26, 1919.
156,852. Pulverising apparatus. W. L. McLaughlin. August 28, 1919.
156,866. Metal-bearing ores, or other metal-bearing materials, Treatment of—and the recovery of the valuable or desired constituents thereof. E. A. Ashcroft. September 30, 1919.
156,892. Thorium compounds, Manufacture of insoluble. H. Wade (Lindsay Light Co.). October 11, 1919.
156,896. Phenol-aldehyde condensation products, Solutions of. G. H. Howse. October 13, 1919.
156,905. Fat or oil from raw materials, Extraction of. H. Bollmann. October 14, 1919.
156,916. Acetic acid, Manufacture of. H. Dreyfus. October 17, 1919.
156,963. Salts, Means for drying. South Metropolitan Gas Co. and P. Parrish. November 14, 1919.
157,030. Phthaleins, Manufacture of. O. Imray (Monsanto Chemical Works). May 31, 1920.
157,036. Coal or fuel carbonisation and gas-making plant. R. & J. Dempster, Ltd., H. S. Knight and F. J. Siddall. July 2, 1920.

Applications for Patents

Ab-der-Halden, C. Distilling coal tar, &c. January 24. (France, October 9, 1920.) 2,998.
Barnett, E. B. Production of chemical compounds or elements by gravitational translation of amalgam formed by electrolysis to hermetically-sealed receptacle. January 26, 3,171.
Barton, B. C. Arrangement of valves for controlling admission of high and low pressure liquid to hydraulic presses. January 27 3,294.
Bawden, C., and Bennett, N. Manufacture of ortho-nitro-phenol and para-nitro-phenol. January 27. 3,369. Separation of ortho- and para-nitro-chlor benzines from mixtures thereof. January 27. 3,370.
Bennett. Separation of ortho- and para-nitro-chlor benzines from mixtures thereof. January 27. 3,370.
Chemische Fabrik auf Actien vorm E. Schering. Manufacture of diethylbarbituric-acid compound. January 25. (Germany. January 26, 1920.) 3,138.
Douse, D. F. Manufacture of ethyl-chloroformic ester. January 27. 3,371.
Freeth, F. A. Production of ammonium chloride and sodium carbonate. January 24. 2,921.
Leask, H. N. Purification or treatment of air or gas with liquid. January 25. 3,125.
Lyman, E. Apparatus for rendering fats, drying, sterilizing, or destroying animal matter. January 29. 3,586.
Nicholson, A. Indicator for liquid containers. January 25. 3,075.
Parrish, P. Manufacture of ammonium sulphate. January 24. 3,033.
Prager, H. A. Manufacture of naphthalene compounds. January 24. 3,032.
Rheinisch-Nassauische Bergwerks-und Hütten Akt.-Ges. Process for producing zinc dust having a high percentage of metallic zinc. January 28. (Germany, November 22, 1920.) 3,481.
South Metropolitan Gas Co. Manufacture of naphthalene compounds. January 24. 3,032.
" Manufacture of ammonium sulphate. January 24. 3,033.
Torfverwertungsges. Dr. Pohl & von Dewitz, *formerly* Torfverwertung Dr. Pohl Komm. Ges. Dry distillation and coking of raw peat, &c. January 24. (Germany, January 22, 1920.) 2,978.
United Alkali Co., Ltd. Separation of ortho- and para-nitro-chlor benzines from mixtures thereof. January 27. 3,370.
Wilton, T. O. Utilization of waste gases from furnaces, fire-boxes, &c., for extraction of by-products from coal, &c. January 28. 3,407.

Patents Court Cases

NOTICE has been given of an application under Rule 7 of the Treaty of Peace Rules, 1920, by Scottish Dyes, Ltd., of Murrell Hill Works, Carlisle, for the grant of licences in respect of patents 12,584/1913, relating to compounds and colouring matters of the anthracene series, and 12,817/1913, relating to vat colouring matters; these patents are in the name of J. Y. Johnson (*Badische Anilin and Soda Fabrik*). Any notice of opposition must be given by February 28, 1921.

Licences of Right

Application has been made under Section 24 of the Patents and Designs Acts, 1907 and 1919, for the following patents to be indorsed "Licences of Right":—22,746/1913 (E. Collett), relating to concentrating nitric acid; 146,546 (C. W. Bailey and ors.), relating to the production of ammonium sulphate.

Technical Books for Russia

To the Editor of THE CHEMICAL AGE

SIR: At the beginning of this year an appeal was issued for funds to enable a certain number of scientific and literary publications to be sent to the House of Science and House of Literature in Petrograd, where the remnant of the intellectual life of Russia is mostly congregated. The British Committee for Aiding Men of Letters and Science in that country has assured itself that such publications will reach their destination, and has made arrangements for their transmission. There are probably many authors who would be willing to send copies of their works in the form of excerpts or otherwise to Russian workers who have been cut off from the outside world since the revolution. The British Committee will be glad to receive any such books or papers of a non-political type and to send them to Petrograd. It cannot guarantee delivery to individuals, but it can ensure that publications will reach the Houses of Literature and Science. Parcels for transmission should be addressed to us, care of Wm. Dawson & Sons, Ltd., Continental Dept., Rolls Buildings, Fetter Lane, E.C.—Yours, &c.,

British Science Guild Offices,
6, John Street, Adelphi, W.C. 2.
Jan. 26, 1921.

L. F. SCHUSTER,
Secretary.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

THURSDAY, February 3.

The realisation of stocks continues under somewhat better conditions, and there are signs of greater stability in markets generally. Only a very limited amount of forward business is passing, as the buying continues to be almost exclusively of the hand-to-mouth variety.

The violent fluctuation in the foreign exchanges militates against any considerable volume of business in that direction.

General Chemicals

ACETONE.—There is no change in price and the article passes steadily into consumption.

ACETIC ACID.—Although there has only been a light demand the undertone is firm, and an improvement in price is looked for.

ACID CARBOLIC is a nominal market with no business passing.

ACID CITRIC has again been reduced by second-hand holders and a small business is indicated.

ACID FORMIC is very quiet and favours buyers.

ACID OXALIC is again lower in price owing to Continental realisations. Makers, however, are inclined to hold their price.

ACID TARTARIC is in poor demand, but the price appears to have reached bottom.

AMMONIA CARBONATE.—The makers have substantially reduced their price, with a view to meeting Continental competition.

BLEACHING POWDER is still on offer in considerable quantities, but no business of importance can be detected.

COPPER SULPHATE is a lifeless market, and prices continue in buyers' favour.

FORMALDEHYDE seems to have found its level, but only a small business is being transacted.

LEAD ACETATE.—The price is steady, but the business is only of very small proportions.

LITHOPONE has not been in quite such good demand and price is lower.

MAGNESIUM SALTS are stagnant.

POTASSIUM BICHROMATE.—The English makers' price has been considerably reduced.

POTASSIUM CARBONATE.—The substantial reduction in price which is reported fails to stimulate business.

POTASSIUM CAUSTIC.—There is no demand, and prices have been radically reduced.

POTASSIUM PRUSSIATE is only in small demand, but stocks are firmly held.

SALAMMONIAC is easy on Continental offerings, but practically no business is reported.

SODIUM ACETATE is in steady demand at recent levels.

SODIUM BICHROMATE.—The English makers notify a small reduction in their price.

SODIUM CAUSTIC still tends upwards on realisation of stocks.

SODIUM HYPOSULPHITE is again cheaper, and business is hard to find.

SODIUM NITRITE is easy and inclined to favour buyers.

SODIUM PRUSSIATE is again slightly weaker in price owing to the continued absence of export business.

Coal Tar Intermediates

There is scarcely any change in the position of this market, and trade continues uninteresting, and the business concluded is only of very small proportions.

ALPHA NAPHTHOL is slightly more active, but makers could still do with more business. Price is unchanged.

ANILINE OIL AND SALT are unchanged, but business is very light.

BETA NAPHTHOL is in very small demand, and price is nominally without change.

DIMETHYLANILINE is slow of sale and price is inclined to favour buyers.

DIPHENYLAMINE is idle, but the price is maintained.

NITROBENZOL is in slightly better demand, but the business passing still leaves a lot to be desired.

PARANITRANILINE is in slightly better request, and makers hold firmly to their price.

PARATOLUIDINE seems to be in better inquiry, although makers could do with considerably more business.

RESORCIN is idle, and price continues to droop.

SALICYLIC ACID still continues in buyers' favour, and the present price is stated to be below the present manufacturing cost.

Coal Tar Products

There is little change in our market since last week.

90 PER CENT. BENZOL shows more activity and prices are a little steadier, being about 2s. 9d. to 2s. 10d. on rails in the North and 2s. 11d. to 3s. in the South.

PURE BENZOL remains unchanged at 2s. 10d. to 3s.

CREOSOTE OIL.—A moderate amount of business has been done during the last week, and there are ready sellers at 1s. per gallon on rails in the North and 1s. 1d. to 1s. 2d. in the South.

CRESYLIC ACID remains unchanged at 2s. 9d. to 3s. for Dark, 95-97 per cent., and 3s. 6d. to 3s. 9d. for Pale, 97-99 per cent.

SOLVENT NAPHTHA is quoted at 2s. 5d. on rails.

HEAVY NAPHTHA is inactive at 3s.

NAPHTHALENE is also weak, and crude qualities are worth from £9 to £15 per ton, while Refined is worth from £24 to £26 per ton.

PITCH.—The Market continues extremely quiet, but there is rather more inquiry and a small amount of business has been done at prices which have not been disclosed. The value to-day may be taken as 160s. to 170s. per ton f.o.b. the various ports.

Sulphate of Ammonia

There is no change in the position, and the home trade demand does not yet appear to be very active.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	2	6	to	0	2	9
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	100	0	0	to	105	0	0
Acid, Acetic, glacial, 99-100%	ton	70	0	0	to	72	0	0
Acetic, 80% pure	ton	53	0	0	to	54	0	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	72	10	0	to	74	0	0
Carbolic, cryst. 39-40%	lb.	0	0	9	to	0	0	9½
Citric	lb.	0	2	4	to	0	2	6
Formic, 80%	ton	80	0	0	to	85	0	0
Gallic, pure	lb.	0	5	0	to	0	5	3
Hydrofluoric	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol.	ton	42	10	0	to	43	10	0
Lactic, 60 vol.	ton	47	10	0	to	50	0	0
Nitric, 80 Tw.	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	1	0	to	0	1	1
Phosphoric, 1.5	ton	65	0	0	to	67	0	0
Pyrogallic, cryst	lb.	0	10	6	to	0	10	9
Salicylic, Technical	lb.	0	1	6	to	0	1	8
Salicylic, B.P.	lb.	0	1	9	to	0	2	0
Sulphuric, 92-93%	ton	8	10	0	to	8	15	0
Tannic, commercial	lb.	0	3	6	to	0	3	9
Tartaric	lb.	0	1	11	to	0	2	0
Alum, lump	ton	18	0	0	to	18	10	0
Alum, chrome	ton	45	0	0	to	50	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	13	0	0	to	14	0	0
Aluminium, sulphate, 17-18%	ton	15	5	0	to	16	0	0
Ammonia, anhydrous	lb.	0	2	2	to	0	2	4

	per	£	s.	d.		£	s.	d.
Ammonia, .880	ton	43	0	0	to	45	0	0
Ammonia, .920	ton	30	0	0	to	32	10	0
Ammonia, carbonate	lb.	0	0	4	to	—		
Ammonia, chloride	ton	85	0	0	to	90	0	0
Ammonia, muriate (galvanisers)	ton	57	10	0	to	60	0	0
Ammonia, nitrate	ton	55	0	0	to	60	0	0
Ammonia, phosphate	ton	95	0	0	to	100	0	0
Ammonia, sulphocyanide	lb.	0	3	0	to	0	3	3
Amyl acetate	ton	420	0	0	to	425	0	0
Arsenic, white, powdered	ton	77	10	0	to	80	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	21	0	0	to	23	0	0
Nitrate	ton	55	0	0	to	56	0	0
Barium Sulphate, blanc fixe, dry	ton	30	0	0	to	31	0	8
Sulphate, blanc fixe, pulp	ton	16	10	0	to	17	0	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	0
Bleaching powder, 35-37%	ton	22	0	0	to	23	0	0
Borax crystals	ton	39	0	0	to	41	0	0
Calcium acetate, Brown	ton	15	0	0	to	17	0	0
„ Grey	ton	23	0	0	to	25	0	0
Calcium Carbide	ton	29	0	0	to	30	0	0
Chloride	ton	12	10	0	to	13	0	0
Carbon bisulphide	ton	65	0	0	to	67	0	0
Casein, technical	ton	90	0	0	to	92	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	11	6	to	0	12	6
Oxide, black	lb.	0	16	0	to	0	16	6
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	39	0	0	to	40	0	0
Cream Tartar, 98-100%	ton	200	0	0	to	210	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol	ton	130	0	0	to	135	0	0
Formusol (Rongalite)	lb.	0	4	9	to	0	5	1
Glauber salts	ton	Nominal.						
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	50	0	0	to	52	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	58	0	0	to	60	0	0
Carbonate (White Lead)	ton	47.	0	0	to	50	0	0
Nitrate	ton	62	10	0	to	65	0	0
Litharge	ton	53	0	0	to	55	0	0
Lithopone, 30%	ton	37	10	0	to	40	0	0
Magnesium chloride	ton	15	10	0	to	16	10	0
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	12	10	0	to	13	0	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	190	0	0	to	—		
Sulphate	ton	130	0	0	to	135	0	0
Methyl acetone	ton	95	0	0	to	100	0	0
Alcohol, 1% acetone	gall.	Nominal.						
Nickel sulphate, single salt	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potassium bichromate	lb.	0	1	1	to	—		
Carbonate, 90%	ton	85	0	0	to	90	0	0
Chloride	ton	50	0	0	to	52	0	0
Chlorate	lb.	0	0	8½	to	0	0	9
Meta bisulphite, 50-52%	ton	200	0	0	to	205	0	0
Nitrate, refined	ton	63	0	0	to	65	0	0
Permanganate	lb.	0	2	6	to	0	2	9
Prussiate, red	lb.	0	2	6	to	0	2	9
Prussiate, yellow	lb.	0	1	6	to	0	1	7
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	5	0	0	to	—		
Seconds	cwt.	4	15	0	to	—		
Sodium acetate	ton	45	0	0	to	47	10	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	9½	to	0	0	10
Bisulphite, 60-62%	ton	37	10	0	to	40	0	0
Chlorate	lb.	0	0	5½	to	0	0	5½
Caustic, 70%	ton	27	0	0	to	28	0	0
Caustic, 76%	ton	28	0	0	to	29	0	0
Hydrosulphite, powder, 85%	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial	ton	26	0	0	to	27	0	0
Nitrite, 96-98%	ton	60	0	0	to	62	0	0
Phosphate, crystal	ton	32	0	0	to	35	0	0
Perborate	lb.	0	2	2	to	0	2	4
Prussiate	lb.	0	0	8½	to	0	0	9
Sulphide, crystals	ton	22	0	0	to	25	0	0
Sulphide, solid, 60-62%	ton	45	0	0	to	47	0	0
Sulphite, cryst.	ton	15	0	0	to	16	0	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Strontium Nitrate	ton	90	0	0	to	95	0	0
Strontium Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	19	0	0	to	19	10	0
Roll	ton	19	0	0	to	19	10	0
Tartar emetic	lb.	0	2	6	to	0	2	9
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb	0	2	0	to	0	2	1
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	45	0	0	to	47	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	4	0	to	0	4	3
Alphanaphthol, refined	lb.	0	4	6	to	0	4	9
Alphanaphthylamine	lb.	0	3	3	to	0	3	6
Aniline oil, drums extra	lb.	0	1	8	to	0	1	9
Aniline salts	lb.	0	1	10	to	0	2	0
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	5	9	to	0	6	0
Benzidine, base	lb.	0	11	6	to	0	12	0
Benzidine, sulphate	lb.	0	10	0	to	0	10	6
Benzoic acid	lb.	0	2	6	to	0	2	9
Benzoate of soda	lb.	0	2	3	to	0	2	6
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	9	6	to	0	10	0
Betanaphthol	lb.	0	3	0	to	0	3	3
Betanaphthylamine, technical	lb.	0	11	6	to	0	12	6
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	6	9	to	0	7	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	6	to	0	1	8
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	3	0	to	0	3	3
Dimethylaniline	lb.	0	5	9	to	0	6	0
Diphenylamine	lb.	0	5	0	to	0	5	3
H-Acid	lb.	0	10	0	to	0	10	6
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	4	0	to	0	4	3
Naphthionate of Soda	lb.	0	4	3	to	0	4	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	0	to	0	5	6
Nitronaphthalene	lb.	0	1	6	to	0	1	8
Nitrotoluol	lb.	0	1	4	to	0	1	5
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	2
Orthotoluidine	lb.	0	2	3	to	0	2	6
Orthonitrotoluol	lb.	0	1	3	to	0	1	4
Para-amidophenol, base	lb.	0	12	6	to	0	13	0
Para-amidophenol, hydrochlor	lb	0	13	0	to	0	13	6
Paradichlorbenzol	lb.	0	0	7	to	0	0	8
Paranitraniline	lb.	0	6	6	to	0	7	0
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	6
Paratoluidine	lb.	0	8	3	to	0	8	6
Phthalic anhydride	lb.	0	4	9	to	0	5	0
Resorcin, technical	lb.	0	7	6	to	0	8	6
Resorcin, pure	lb.	0	10	0	to	0	10	6
Salol	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	1	8	to	0	1	9
Tolidine, base	lb.	0	8	6	to	0	10	0
Tolidine, mixture	lb.	0	2	9	to	0	3	0

Manchester Chemical Trade

SIR S. W. ROYSE & CO., LTD., Manchester, in their monthly review of the chemical trade, state: "During January trade has continued quiet, although there has recently been a better feeling and more inquiry. The amount of actual business done has, however, been small and mostly for early delivery. Sulphate of copper has been receiving little attention for either home or export, but the price has remained steady. There has been only a moderate call for green copperas, and, although the stoppage of tinplate works in South Wales has curtailed production, stocks are ample to meet requirements. Acetates of lime have been pressed for sale with little success. Acetic acid is steadier, but lower prices have been accepted

for acetates of lead and soda. Nitrate of lead has been only in limited inquiry. Carbonate of potash has been in poor demand and the price has eased. Sulphate of potash is also lower and there is practically no demand for Montreal potashes. Caustic potash also is quiet. Yellow Prussiate of potash has ruled steady, but trade has been confined to small lots. Prussiate of soda is cheaper, and although latterly there has been a better inquiry from abroad, the amount of trade done is only small. Stocks of white powdered arsenic have accumulated somewhat and concessions in price are offered, but the response is poor.

Tartaric acid has been moving better and the forward position is decidedly firmer, good business having been done for delivery well ahead. There has been a further fall in the price of cream of tartar, although stocks have been reduced. Citric acid is stronger, the raw material being firmly held, and a premium is being paid for forward delivery. Bichromates are in poor request and stocks of foreign make are still pressed for sale. Business in oxalic acid has been only in small lots. The price of borax was reduced early in the month by £3 per ton, but boracic acid remains unchanged; makers of these products continue to be well supplied with orders. Second-hand parcels of phosphate of soda are freely offered at below makers' prices. Alum and sulphate of alumina have moved steadily. The demand for muriate of ammonia is slow and there has been little call for salammoniac. Bleaching powder and white caustic soda have been in only moderate demand.

Tar products generally remain quiet and values have an easier tendency. Benzol continues in moderate demand without alteration in price and toluols are without inquiry. There is little demand for solvent naphtha and values are lower. Creosote also is being offered at reduced figures. Inquiry is slow for cresylic and crystal carbolic acids. The demand has fallen away for all qualities of naphthalene and prices are consequently lower. Little business is passing in pitch and prices are falling. Consumers' works are well stocked and in some cases full up and deliveries suspended. Sulphate of ammonia shows practically no change though export prices are easier.

Recent arrivals of American pearl starch have eased the position and a fair amount of business has been done, but for near delivery only. Farina continues to be pressed for sale at lower prices, especially for forward delivery, but the response is only moderate. The demand for dextrine has fallen away somewhat and lower prices have been accepted. There is keen competition for business in barytes and prices are in buyers' favour. Turpentine is slow of sale and price is lower. Imported olive oil soap is in poor demand."

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. No.
Vancouver ...	Dry colours; oxides; dyes; chemicals; glues; fertilisers; oils.	123
Colombo ...	Rubber; oil seeds	128
Brussels ...	Paint; varnish	132
Persia ...	Drugs; rubber goods; glass; soap. Applications to the Department of Overseas Trade, 35, Old Queen Street, Westminster, London, S.W.1.	...
San Francisco	Dry colours; cresylic acid ...	177
China, Shanghai and Hongkong	Linseed oil. Applications to the Department of Overseas Trade, 35, Old Queen Street, Westminster, London, S.W.1.	174

Tariff Changes

DENMARK.—The prohibition on the exportation of the following goods from Denmark has been removed: oil cake, oil seeds and other oleaginous products, copra, sesame seed, cotton seed, ground nuts, soya beans, palm kernels, and linseed; olea stock (premier jus), oleo oil and oleo stearine.

FRANCE.—The prohibition on the export (and re-export) of pure fixed vegetable oils is withdrawn. The export of oil cake is still subject to licence, but the export duty is reduced to the following rates:—oil cake, sulphated, for manure, 2·50 fr. per 100 kilogs (gross weight); other oil cake, 10 fr. per 100 kilogs (gross weight).

ITALY.—The customs duty on benzene, benzol, toluol, xylol and other mineral, &c., oils, except heavy oils, is increased from 16 to 24 lire per 100 kilogs. Benzol and other coal tar oils, light and limpid, for use as raw materials in the manufacture of artificial organic colours or of varnishes, lacquers and similar products, may be admitted at the reduced duty of 2 lire per 100 kilogs, if denatured at the expense of the parties concerned, by methods laid down by the Minister of Finance.

Nitrate of ammonia for use as an agricultural manure is now classed for Customs purposes as "chemical fertilisers" and is thus admitted into Italy duty free. To secure the benefit of this classification, however, the product must be adulterated and proof of its use for the purpose must be supplied. The importation of white phosphorus for uses other than match making is subject to the permission of the Minister of Finance.

NETHERLANDS.—The prohibition on the exportation for the Netherlands of coal tar and its residues has been withdrawn.

Chemical Fumes and Vegetation.

SOME interesting information with regard to the effects of the fumes of picric acid on vegetation was given at a recent meeting of the Society of Chemical Industry at Leeds by Messrs. B. A. Burrell and G. W. Douglas. During 1916 and subsequent years, it was stated, a great deal of damage was observed in the vicinity of a picric acid works situated in a semi-agricultural district in the south of England. It was observed that the leaves of trees in proximity to the works became dry and shrivelled and, in the majority of cases, fell off long before the autumn. While such trees as ash, elm, elder, oak and sycamore were found to offer resistance, the beech trees appeared to suffer most. The damaged leaves were examined for the presence of nitrates, which would be the product of the action of nitric fumes upon the constituents of the leaf, and nitrates were found in all the damaged leaves. From undamaged leaves growing in the same district, but not exposed to the nitric fumes, they were absent, as well as from trees in Springfield Mount, Leeds, and at Ilkley.

Cheap Chemical Scales

A REPORT has been received in the Department of Overseas Trade from the British Trade Commissioner in New Zealand relative to an inquiry from a Wellington firm who are dealers in photographic supplies, for information as to the possibility of securing in the United Kingdom cheap chemical scales for use by amateur photographers. It is understood that, before the war, scales of this kind were imported into New Zealand chiefly from Germany, and at that time the retail price was about 5s. 6d. per set. It is thought that there is now a market in New Zealand for scales selling at a price from of 10s. 6d. to 12s. 6d. per set. The Trade Commissioner explains that the type of scales required is such that the trays should rest on a box base when not in use, and that a simple device should be fitted for raising the beam.

German Alcohol Prices

ALCOHOL prices in Germany for the coming year have been fixed by the Alcohol Monopoly Board at the following prices, on a basis of absolute ethyl alcohol; for the manufacture of spirituous beverages, 4,000 marks for 100 litres; for the preparation of perfumes, essences, and of medicinal products by pharmacists and druggists, 2,200 marks per 100 litres; when supplied to hospitals and public schools or teaching institutions for research purposes, 620 marks for 100 litres. For manufacturing and industrial purposes, as well as for lighting, cleaning and heating, the price is 700 marks for 100 litres.

Company News

AMALGAMATED ZINC (DE BAVAY'S).—The report of the Amalgamated Zinc (De Bavay's), Ltd., for the half-year ended June 30 last, states that a loss of £1,799 was shown, after transferring £9,489 to reserve for depreciation and taking into account £21,201, being the increase in profit due to difference between actual value realised and estimated valuation made in the previous half-year's accounts in respect to products then in course of realisation and on hand. The revenue derived from interest, &c., amounted to £11,176, and after deducting the loss already mentioned, together with other usual items, the balance transferred to appropriation account was £4,104, which, added to £2,985 brought forward, makes £7,089, which is carried forward. The surplus of liquid assets less liabilities as at June 30 last amounted to £117,091.

ANTON JURGENS' UNITED (MARGARINE) WORKS.—Dividend for the half-year to Dec. 31 last at the rate of 6 per cent. per annum, less tax, on the cumulative participating "B" preference shares, payable Feb. 1 to holders on the register Jan. 20.

BEXAR COMPANY.—Notice is given that the corporation JOSE MIGUEL BEJARANO, INC., has been merged ihto a new corporation organised under the laws of the State of New York, under the name the Bexar Company, Incorporated, and by such merger the Bexar Company, Incorporated, succeeds to the business, acquires all the rights and property, and assumes all the obligations of Jose Miguel Bejarano, Inc. In the future all business heretofore transacted by Jose Miguel Bejarano, Inc., will be carried on and transacted under the name of and by The Bexar Company, Incorporated. We are also informed that The Bexar Company of Mexico, S.A., has been incorporated under the Mexican laws with headquarters at Mexico City and branches and agents to cover the entire country. The Bexar Company of Mexico, S.A., is an affiliate of The Bexar Company, Inc., of New York, and acts in Mexico as manufacturers' agent and wholesale druggist.

BRITISH CELLULOSE.—The British Cellulose and Chemical Manufacturing Company have decided not to pay the dividend on the cumulative preference shares of the company which became due on February 1. The directors say: "It will be within the recollection of the shareholders that in the full review of the company.s position, given by the chairman at the annual general meeting held on December 9, it was made clear that until the manufacture of silk had reached the ommercial scale, the general charges of the company would exceed the receipts, and that a dividend could not therefore be expected for some little time. Although less than two months have elapsed since the general meeting, the board inform the shareholders that the manufacturing progress has continued, and is, in their opinion, satisfactory. In addition, research work in dyeing our silk has borne fruit, and they are assured by the firm of Clave and Lindenmeyer, of Basle, one of the great dyeing firms of the Continent, that the new processes are a wonderful advance on anything yet done either for artificial or natural wilk, and will place our product in a position of great advantage. "The statement promised for six months from the annual meeting will be issued in due course."

BRITISH OIL AND CAKE MILLS.—Dividend 1s., payable March 7.

BRUNNER, MOND & CO., LTD.—A Stock Exchange announcement states that dealings in 84,282 ordinary shares of £1 each fully paid, Nos. 9,487,168 to 9,571,449, have been specially allowed by the Committee, under Temporary Regulation 4 (3).

ELLIOTT'S METAL.—Interim dividend at the rate of 10 per cent. per annum (1s. per share), less tax on ordinary for half year, payable March 2nd. Last year, dividend same.

GAS, LIGHT AND COKE.—Dividend on ordinary shares, 3 per cent., payable March 1.

LEVER BROTHERS, LTD.—A Stock Exchange announcement states that dealings in 81,574 7 per cent. preference shares of £1 each, fully paid, Nos. 23,453,979 to 23,458,185 and 23,473,797 to 23,551,163; 15,660 8 per cent. "A" preference shares of £1 each, fully paid, Nos. 15,439,864 to 15,440,714 and 15,449,246 to 15,464,054 have been specially allowed by the Committees under Temporary Regulation 4 (3).

LONDON NITRATE.—The profit of the London Nitrate Co. for year to June 30, 1920, after deducting depreciations, including transfer fees, was £65,049, plus £8,993 brought in, making £74,042, less office expenses in Liverpool £3,769, income-tax and Corporation Tax £6,291. Debenture interest £9,000, bank interest £11,531, stoppage of works expenses and repairs (balance) £14,419, one-fifth of expenses of denenture issue £856, leaving £28,175. Dividend of 1s. 6d. per share, free of tax, paid absorbed £15,000, leaving £13,175 tobecarried forward. Stoppage of work, which was general on nitrate fields during the first half of period, involved total cost of £19,065, of which £4,646 has been provided for out of "Snata Laura" and "Transito," provision for stoppage, and balance £14,419 has been met out of profits made during second half of year. £10,000 has been written off out of profits for depreciation at "Santa Laura." In March, 1920, an issue of 40,000 shares at £2 10s. per share was made and fully subscribed by shareholders. Proceeds were employed in reduction of bank overdraft. Issued share capital now stands at 2000,000 £1 shares.

PAN DE AZUCAR NITRATE.—The directors have declared a dividend of 10 per cent., free of tax, for the year to June 30 last. Warrants will be posted on February 15.

Contracts Let

THE following Government Contracts were let during December:—

ADMIRALTY.—Chemicals: Brunner Mond & Co., Ltd., Northwich; Burgoyne, Burbridges & Co., London, E. Pitch, Marine Glue: A. Jeffrey & Co., London, E. Red Lead: Alexander Fergusson & Co., Ltd., Glasgow; Cookson & Co., Ltd., Newcastle-on-Tyne; Walker, Parker & Co., Ltd., Chester. Soda Ash: Brunner, Mond & Co., Ltd., Northwich.

WAR OFFICE.—Chloride of Lime: United Alkali Co., Ltd., Liverpool; A. C. Young & Co., London. Pump, Centrifugal: Pulsometer Engineering Co., Ltd., Birmingham. Soda Crystals: Brunner, Mond & Co., Ltd., Silvertown, E. Turpentine: Langley, Smith & Co., London.

AIR MINISTRY.—Dope: British Cellulose & Chemical Manufacturing Co., Ltd., London, S.W. Furnace Fuel Oil: Anglo-American Oil Co., Ltd., London, E.C.

POST OFFICE.—Methylated Spirit: W. H. Palmer & Co., Ltd., London, E.C.

HIGH COMMISSIONER FOR INDIA.—Bleaching Powder: United Alkali Co., Ltd., Liverpool. Potassii Iodidum: Howards & Sons, Ltd., Ilford.

CROWN AGENTS FOR THE COLONIES.—Blasting Powder: Curtis & Harvey, London, E.C.

Contracts Open

TENDERS are invited for the supply of the following materials (latest date of receiving tenders in parenthesis):—

DUBLIN.—(February 10): Calcium carbide, white and red lead. Forms from and tenders to J. B. Phelps, Irish Lights Office, Dublin.

WOOD GREEN.—(February 9): Distilled tar. Forms from, and tenders to, W. P. Harding, Town Hall, Wood Green, London, N. 22.

NEWPORT (I.W.).—(February 9): Refined tar (60,000 gallons). Forms from, and tenders to, H. E. Stratton, Council Offices, 30, Pyle Street, Newport, I.W.

HATFIELD.—(February 15): Refined tar. Forms from, and tenders to, A. E. Prescott, County Surveyor, Hatfield, Herts.

RICHMOND. (Surrey)—(February 14): Dehydrated tar. Forms from Borough Surveyor; tenders to H. Sagar, Town Hall, Richmond, Surrey.

PADIHAM.—(March 5): Creosote oil. Forms from R. Ratcliffe, tenders to J. C. Waddington, both at Council Offices, Padiham.

MANCHESTER.—(March 9): Oxide of iron (2,000 tons); also for purchase of spent oxide on the basis of the contents of sulphur and blue. Forms from G. W. Kaye, Gas Department, Town Hall, Manchester. Tenders to Chairman, Gas Committee.

The annual report of the Indian Board of Scientific Advice for the year 1918-19 states that a new Department of State is to be established, to be known as the Imperial Department of Industries. The Chemical Services Committee reports that it recommends the ESTABLISHMENT OF AN INDIAN CHEMICAL SERVICE, but does not consider that industrial research associations, on the lines of those formed in England, can usefully be formed, but that a more intimate system of State assistance will be necessary.

CARBONATE OF AMMONIA

FACTORIES
BIRMINGHAM
GLASGOW
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LIVERPOOL
PORT RAINBOW
SUNDERLAND
WAKEFIELD
WORKINGTON

BROTHERTON
& Co., Ltd.,
LEEDS

CHAS. ZIMMERMANN & CO. (Chemicals), Ltd.

Telegrams: "ACIDOLAN LONDON."
9 & 10, ST. MARY-AT-HILL, LONDON, E.C.
Telephones: Avenue 5933, 5934, 5935, 5936.
Essential Oil Dept.: Manager, Mr. W. V. Guenigault, 33 St. Mary-at-Hill, E.C.

Entirely British Firm.

CHEMICALS FOR ALL PURPOSES, DRUGS, ESSENTIAL OILS, ETC.

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ACETANILIDE
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BISMUTH SALTS
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CAMPHOR MONOB.
CARMINE
CASTOR OIL
CHLORAL HYDRATE
CHLOROFORM
CHLOROPHYL
CITRIC ACID
COCAINE
CODEINE
COD LIVER OIL
COUMARIN
CREAM OF TARTAR
CREOSOTE CARBONATE
CREOSOTE ex B. WOOD
DEVATOL
DIASTASE
ERGOT OF RYE
ESSENTIAL OILS
FLOWER OILS
FORMALDEHYDE
GALLIC ACID
GELATINE
GLYCERINE
GLYCEROPHOSPHATES
GUAIACOL ABSOLUTE
GUAIACOL CARBONATE
HELIOTROPIN
HETRALINE
HEXAMINE
HYDROKINONE
HYPOPHOSPHITES
ICHTHYOL
INSECT POWDER
IODIDES
IODOFORM
LACTIC ACID CONC.
LANOLIN
LAVENDER OIL
LECITHIN
LEMON OIL
LITHIA SALTS
LYCOPODIUM
LYSOL
LYSOLINE
MAGNESIUM
MERJODIN
METHYL SALICYLATE
METHYL SULPHONAL
METOL
MORPHIA
OPSONOGEN
ORRIS ROOT
OTTO OF ROSE
OXALIC ACID
PANCREATINE
PAPAINE
PARAFFIN LIQ.
PARAFORMALDEHYDE
PARALDEHYDE
PARAMIDOPHENOL
PEPSINE
PETROLEUM JELLY
PHENACETINE
PHENAZONE
PHENOLPHTHALEIN
POT. BICARB.
POT. BROMIDE
POT. IODIDE
POT. PERMANG.
PRECIPITATED CHALK
PROTARGOL
PYRAMIDON
PYROGALLIC ACID
QUININE
RADIUM
RADIUM PREPARATIONS
RODINAL
SACCHARINE
SAFFRON
SALICYLIC ACID
SALOL
SODA BENZOATE
SODA HYPOSULPHITE
SODA SALICYLAS
SOZOIODOL
SUBITOL
SUGAR OF MILK
SULPHONAL
SYNTHETIC PERFUMES
TANNIC ACID
TARTARIC ACID
TERPINEOL
THYMOL
VANILLIN
VERONAL
YOHIMBINE

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Companies Winding Up Voluntarily

ELECTRO CHEMICAL DEVELOPMENTS, LTD.—Creditors' claims on or before March 1, to the Liquidator, E. A. Ashcroft, 65, London Wall, London, E.C.

V. F. OIL SYNDICATE, LTD. (in voluntary liquidation).—A general meeting of members will be held at 110, Cannon Street, London, on Thursday, March 3, at 3 p.m. S. A. Pettifer, Secretary, Liquidator.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.]*

ALBY UNITED CARBIDE FACTORIES, LTD., LONDON, E.C.—Registered January 18, £50,000 mortgage or charge, to Industrial & General Trust, Ltd., Pinners Hall, E.C.; charged on a debt of £50,134 assigned to the company. *£132,947 1s. August 13, 1920.

NITROGEN FERTILISERS, LTD., LONDON, E.C.—Registered January 18, charge securing £50,000 advanced to Alby United Carbide Factories, Ltd., to Industrial & General Trust, Ltd., Pinner's Hall, E.C.; charged on a debt owing to the company amounting to about £50,134. *Nil. August 30, 1920.

TAYLOR'S DRUG CO., LTD., LEEDS.—Registered January 19, £1,200 mortgage, to Miss F. N. Armitage, Hookholme, Park View Crescent, Roundhay, Leeds; charged on 32, Victoria Road, Widnes. *£61,669 17s. 11½. October 25, 1920.

Satisfaction

CHEMICALS & DYEWARES, LTD., SILKSTONE COMMON.—Satisfaction registered January 20, £3,500, registered January 26, 1916.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

BARLOW, S., St. Columb, chemist, £64 15s. 2d. December 1, 1920.

MATTHEWS, E., Medical Hall, Royston, chemist, £13 18s. 3d. December 16.

HARTLEY, A. R., 106, Chatham Street, Old Kent Road, S.E., acetylene welder, £12 18s. 10d. November 23.

DAVIES, R. S., Medical Hall, The Twyn, Caerphilly, chemist, £30 17s. 8d. December 9.

A Düsseldorf message (sent through the Exchange Amsterdam correspondent) reports that 30 prominent business men are being tried on a charge of SMUGGLING QUANTITIES OF POTASSIUM to Holland. It is understood that 50 railway wagons with potassium and 20 with nitrogenous stuffs have been smuggled over the Dutch frontier, and offered for sale in Maastricht. The authorities are of opinion that the smuggling had only been possible through the medium of disloyal officials.

New Companies Registered

The following have been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.2 :—

DONE, CLEAVE & BURDEN, LTD.—Manufacturing chemists. Nominal capital £2,000 in 2,000 shares of £1 each. Directors: E. Done, J. W. Done, H. D. Cleave, C. W. Burden. Qualification of directors, 100 shares.

FRY, McDONALD, LTD., 166, Piccadilly, W. Consulting, analytical, mercantile and manufacturing chemists. Nominal capital, £2,000 in 1,000 6 per cent. preference shares of £1 each and 1,000 ordinary shares of £1 each. Directors, C. E. Fry, B. C. Fry, A. C. McDonald (joint managing directors). Qualification of directors, £400.

GIBSON & DINNING, LTD.—Chemists, druggists, &c. Nominal capital, £1,500 in 1,500 shares of £1 each. Directors: J. T. Gibson, J. Dinning. Qualification of directors, £250.

LORD (J. E. C.) (MANCHESTER), LTD., Borough Road, Weaste, near Manchester.—Chemical manufacturers. Nominal capital, £100,000 in 100,000 shares of £1 each. Directors: J. E. C. Lord, C. Lord. Qualification of directors, £250. Remuneration of directors, £100 each, chairman £250.

MERCER WARD, LTD. Wholesale and retail chemists and druggists. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors: Lt.-Col. J. W. Kynaston, Capt. C. M. War. Qualification of directors, one share.

RELIANCE CHEMICAL CO., LTD., 107, Gravel Lane, Southwark, S.E.1.—Chemical manufacturers and paper merchants. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors: T. L. Stacy, T. T. Stacy, W. E. Stacy. Qualification of directors, £10. Remuneration of directors, £600.

ROBINSON, A. (YARDLEY), LTD., Church Road, South Yardley, Birmingham. Wholesale and retail chemists and druggists. Nominal capital, £1,500 in 1,500 shares of £1 each. Directors: A. Robinson, Mary L. Robinson. Qualification of directors, one share.

ROBSON, T. B., & CO., LTD., 10, Cheapside, Wombwell, York. Chemists and druggists, &c. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors: T. B. Robson, C. V. Vokins. Qualification of directors, £100.

ROGER & GALLET (LONDON), LTD.—Manufacturing chemists, perfumers and soap makers. Nominal capital, £25,000 in 25,000 shares of £1 each. Directors to be appointed by subscribers. Qualification of directors, 25 ordinary shares. Subscribers: E. J. Berwick, F. J. Young, A. H. Silvester.

STROOD PHARMACY, LTD., 78, High Street, Sotrod, Rochester, Kent. A chemist, druggist, &c. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors: E. Archer, H. B. Burn.

Air Purification in Glasgow

IT has been recommended to Glasgow Corporation by the Corporation Sub-committee on Air Purification that in future any case of emission of dense smoke for two minutes during observation should be reported for prosecution. The committee further agreed to report that, in their opinion, the penalties authorised to be imposed on conviction for such offences are inadequate. It has also been recommended that representations should be made to the Clyde Navigation Trustees that the by-law made by them relative to the emission of excessive smoke from ships while in the harbour be amended in order to make it applicable to ships burning oil or other fuel.

"Sells' Worlds Press"

CONSTITUTING, as it does, the most complete and accurate of all press directories, the 36th edition of Sell's *World's Press* should find a place in the office of every business man. In addition to a comprehensive list of newspapers and periodicals published in the British Isles, there are detailed particulars, including estimated circulations, of papers published in all the British Dominions, including Canada, Australasia, New Zealand, the Indian Empire, South Africa and the Crown Colonies. The foreign press is similarly dealt with.